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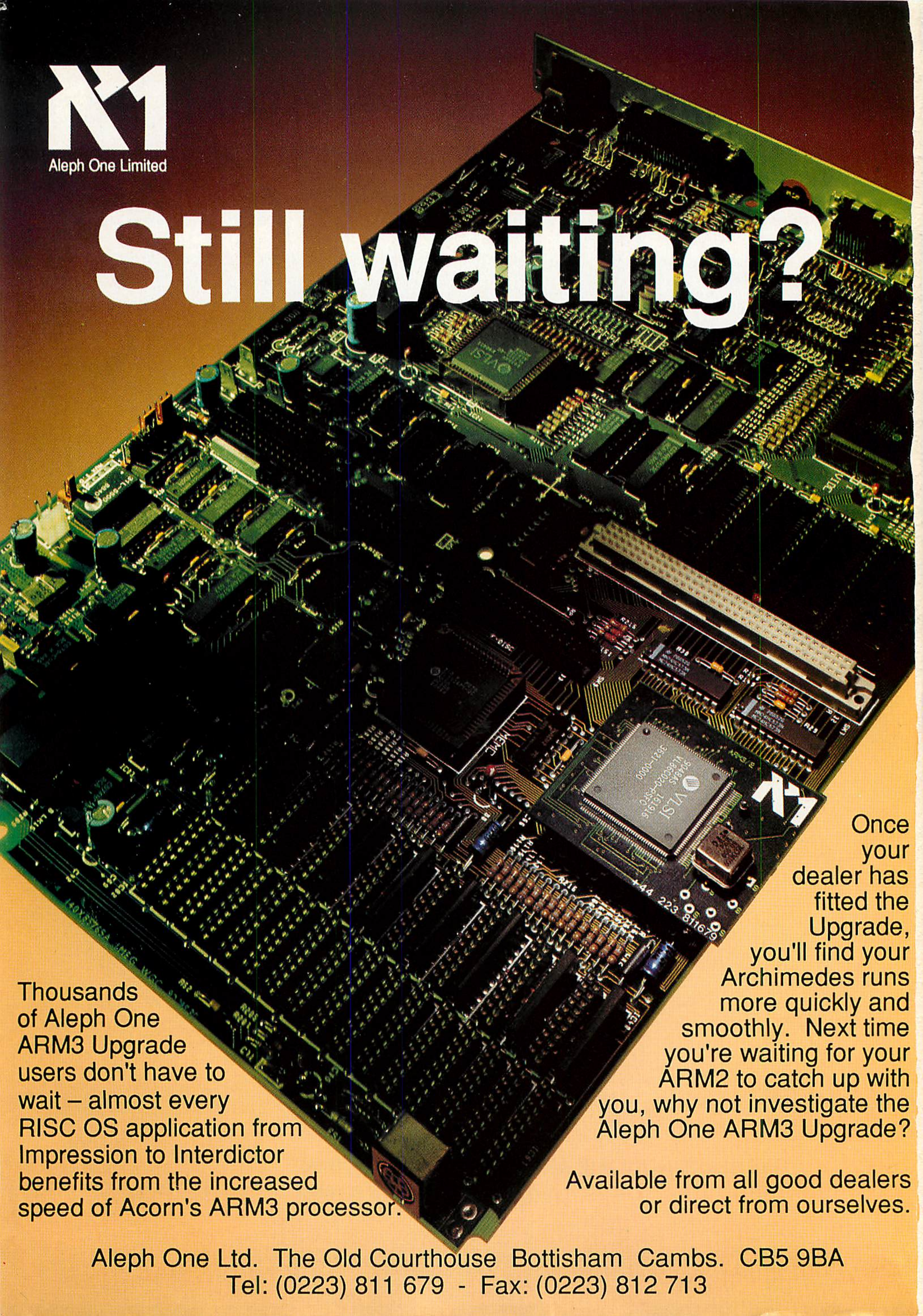
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The *ideA* range of hard disc upgrades is being welcomed as the best way forward for Archimedes and A3000 users. "IDE is the small-computer drive standard for the future," says RISC User. "ST506 is on the way out; SCSI has only a limited future in the small drive market."

PERFORMANCE

IDE is the only true 16-bit hard disc system currently available for Archimedes computers. All data transfers are 16-bit all the way from the disc, through the interface, to the computer (except that the A3000 internal interface has an 8-bit link to the computer).

FLEXIBILITY

An *ideA* system can turn your A3000 into a 20, 40 or 60 Mb workstation with no external attachments, using hard discs which sleep quietly during periods of inactivity.

The *ideA* system caters for two low profile hard discs in the same internal or external housing, allowing you to build up your capacity in easy stages without wasting money.

Then there's the *ideA* 'hard card' option – a 2½-inch hard disc on a standard podule.

VALUE

We think *ideA* upgrades offer the best value for your money, and we aim to keep it that way. Advanced IDE disc technology means simpler, cheaper, more reliable interfaces. Manufacturers' prices for hard discs fall gradually, and we pass these savings on to you as soon as we can.

Our upgrade prices include controller cards and fans where needed. Our disc cases are of metal construction.

RELIABILITY

The first *ideA* customers have been using the system successfully since last year. The A3000 internal hard disc is particularly reliable – not one has had to be returned to us.

The latest IDE discs are ruggedly designed with lap-top and portable computers in mind. You'll wait a long time to see a defect! A skilled service team is ready to back up our guarantee should the need ever arise.

COMPATIBILITY

The Micro User reported "no difficulty in running all fully RISC OS applications". Our IDE filing system is no different from ADFS in use, though it has a few extra features such as the facility to write-protect a hard disc. DOS partitions can be created for the PC Emulator.

CONTINUED SUPPORT

The coming months will see the introduction of many new IDE products, including tape streamers and removable discs. You may rest assured that our software and hardware will keep pace with these developments. Updates for existing users, if they ever become necessary, will be simple and cheap.

"A beautiful solution," said BBC Acorn User. Study our special summer price list overleaf, and let us solve your storage problems too.

Be in at the beginning!

Other products too good to miss!

(See page 20 for full price list)



TWO (Task and Window Organiser)

Do you wish you could start applications, display directories, and open files all in one go? With TWO you can.

Do you wish your pupils were able to start work without understanding the Desktop? With TWO they will be.

Do you wish there was an easy way to tidy up your screen and find that buried window? With TWO there is.

TWO is far more than a 'sticky backdrop'. Its easy-to-use features make the Desktop a friendlier environment and will really save you time.



DrawBender distorts Draw files to follow a shape of your choice. A useful addition or inexpensive alternative to other graphics software, supplied with these three decorative fonts.

DrawBender is simple and enjoyable to use, with no complex menu structures. Yet it produces results of a superior quality using an iterative reparameterisation algorithm. The example above uses DrawBender with **FontFX** – the two make ideal companions.



Baildon Electronics Oddules open the way to cheap, flexible and almost unlimited external expansion via the I²C bus already supported by RISC OS. Baildon are producing a range of Oddules which may be daisy-chained.

Ready now is the ***AnDi*** Oddule. It has eight digital I/O channels with high current open collector drivers, four A/D inputs, and one D/A output. AnDi is capable of emulating user and joystick ports, allowing ADVAL operation from BASIC, and the use of Concept Keyboards and analogue or digital joysticks.

Cross-32 Meta-Assembler

This professional table-based cross-assembler works with over 50 target processors (including ARM2 and 3), and has been used for some time on PCs. A RISC OS Desktop version by Baildon Electronics is now available. Cross-32 is user-friendly and supports conditional assembly and macros. Output is in absolute binary, or Intel or Motorola Hex formats (ideal for eprom programmers and emulators).

You can modify the tables supplied or add new ones to cater for new processors and opcodes.

QuicKey

Do you have trouble remembering what twelve function keys do, with and without Shift and Ctrl, in twenty different applications?

Do you enjoy watching PipeDream insert a column when you thought you were saving an Impression document?

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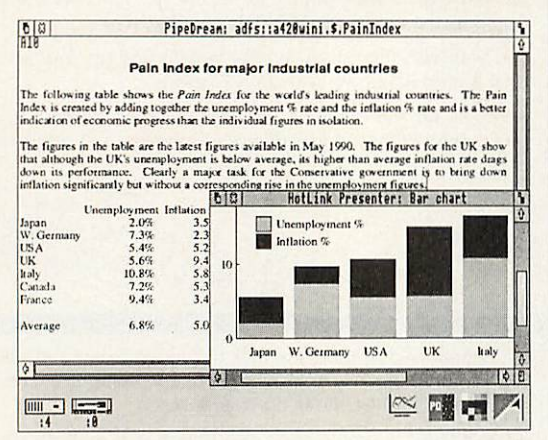


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PIPEDREAM 3

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The bar chart in the screen shown above was produced by using the HotLink between PipeDream 3 and HotLink Presenter.

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- 62 spreadsheet and database functions
- external references between documents for 3-D modelling
- macro file recorder
- slot protection

colton software

PipeDream 3 breaks down the barriers between word processor, spreadsheet and database. With PipeDream 3, you can include numerical tables in your letters and reports, add paragraphs to your spreadsheets, and perform calculations within your databases.

PipeDream 3 has been written to take full advantage of RISC OS – if you can use RISC OS, you can use PipeDream 3. It is fully multi-tasking and multi-windowing, so you can work on many documents at once and instantly move information between them. PipeDream 3 can automatically load and save most popular file formats and is the first program to use the new RISC OS HotLink, which enables it to interact dynamically with Archimedes graphics programs, such as *HotLink Presenter* from Lingenuity and *GraphBox* from Minerva.

As well as winning the 1989/90 BBC Acorn User Award for Best 32-bit Business Software, PipeDream 3 was runner-up in the Best 32-bit Educational Software and Best 32-bit DTP/Word Processor categories.

PipeDream 3
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NEWS 7
EDUCATION 13
COMMS 15
PC COLUMN 17
NEXT MONTH 18
LETTERS 21
QUESTIONS AND ANSWERS 24
ACORN HOTLINE 25
SUBSCRIPTIONS 27
★INFO 49
Our regular column of essential hints and tips for your eight and 32-bit micros
COVER FEATURE – FROM SCALPEL TO SCREEN 56
How the *BAU* team have adapted to producing the magazine on the Arc
A FIRM HANDSHAKE 61
The final part of our comms series which should leave you a bit of an expert
DUMP THAT SCREEN 64
Use the right software to get the best out of your printer. We tell you how
BACK TO BASIC 67
The conclusion of our First Steps on the A3000 looks at 'basic' programming
GOING INTO REVERSI 70
Playing multiple games with our *GameCore* program from last month
KEEP ON STRUMMING 72
Try out this music sequencing program for the BBC micro
CARRY ON SCREAMING 78
The Beeb's archives throw up a classic arcade puzzler and a mathematical spider
YELLOW PAGES 83
BETTER BY DESIGN 98
DTP in schools on the up and up with ESM's *Desktop Folio*
IN-TUITION 104
Touch up your typing with this keyboard tutor from Iota
POUND OF FLESH 108
If you're trying to figure out your food facts, then *Diet Manager* is just for you
SCHOOL LINE-UP 111
Classroom comms gets a boost with the latest version of *ArcComm*
THE MISSING LINK 115
We look at a new option for transferring data between two Arcs
MEGA UPGRADES 116
If you want a super Arc, then read our review of the best upgrade choices
BATTING ORDER 119
Over to Dave Futcher for his review of the *Cricket Database*
GAME SHOW 120
SIMPLE HUES 122
We dip into the VisionQuest *Paintbox* and fly its colours
PUZZLE PAGE 128

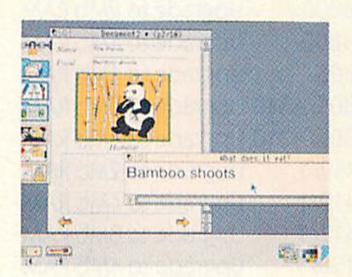
56 FROM SCALPEL TO SCREEN



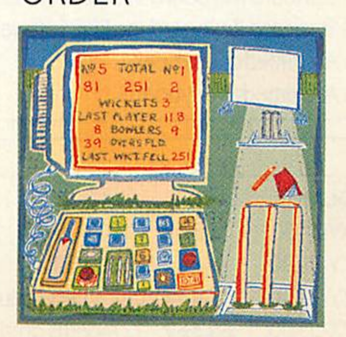
72 KEEP ON STRUMMING



98 BETTER BY DESIGN



119 BATTING ORDER



ARTWORK CREDIT

We would like to thank: Axel Scheffler (illustration page 71), and Cyrus Deboo (illustration page 63), whose credits were ommited on relevant pages.



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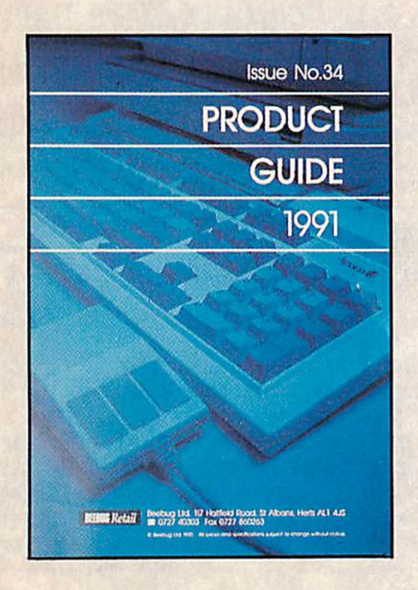
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AU8

The Product Guide



Beebug have published a 72 page full colour A4 product guide for users of BBC, Master, A3000 and Archimedes computers. It contains information on thousands of products that are available now for your computer. Whichever system you use, you will find this illustrated and helpful guide to be an invaluable source of information. Everything is covered from complete systems right down to spare parts. As an added feature comparison charts for monitors and printers are provided along with compatibility and upgrade information.

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VGA PC SOFTWARE RUNS ON DESKTOP

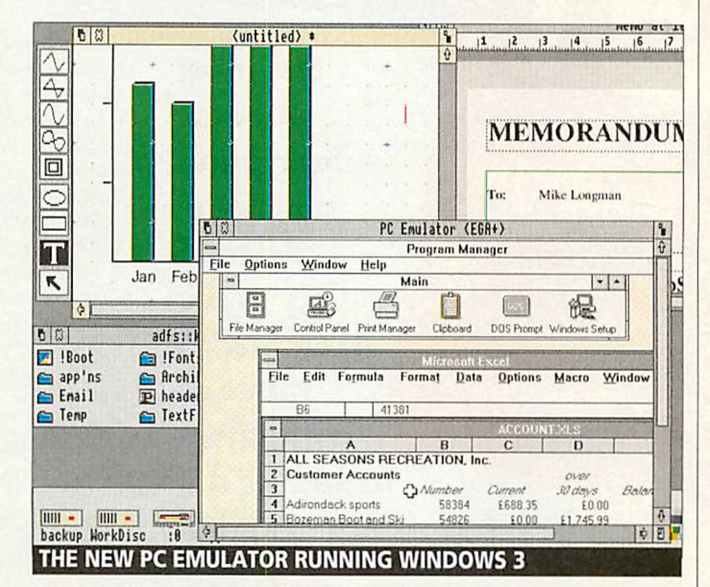
FOLLOWING the news item in last month's issue, Acorn has officially announced the new and improved version of its PC Emulator software for the BBC A3000/Archimedes.

Version 1.60 of the emulator enables standard Dos software to be run on Acorn's range of Risc OS computers. It now runs from and returns to the Risc OS desktop environment, leaving current applications and data intact.

On machines with a minimum of 2Mb of memory, Dos applications can be run concurrently with Risc OS applications. Dos files can also be accessed directly from Risc OS, allowing them to be copied, deleted and dragged as if they were Risc OS files.

The emulator also provides full CD Rom support via CDFS and MSCD extensions, which allows access to standard PC-based CD Roms.

MS-Dos 3.3 is supplied with the emulator and a special mouse driver, enabling the standard Arc mouse to be used as a Microsoft bus mouse.



THE NEW PC EMULATOR RUNNING WINDOWS 3

The emulator can run in CGA, EGA and MDA graphics modes with partial support for VGA for software which accesses the video hardware directly. *Windows 3*, for example, can be run on the emulator.

Acorn's marketing director, Mike O'Riordan, is convinced that 'previously die-hard Dos users who use the emulator will now discover the benefits of using Risc OS.'

The PC Emulator version 1.6 will be available later this month and will cost £99. Owners of the existing emulator can upgrade for £29.

For further details contact Acorn Computers, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN. Tel: (0223) 245200.

ARC UNIX AT LOW COST

ACORN has released its X/Open XPG3-branded Risc iX version 1.2 to Archimedes 400-series machines, allowing Unix to run for the first time.

In addition, R140 machine owners presently running Risc iX 1.13 can now upgrade to an X/Open operating system.

As part of the installation, users can also obtain the latest versions of C, Fortran and Pascal compilers, the *X Window System* version 11 release 4 and a wide range of utilities.

Upgrades start from £349 for existing R140 owners and new installations start at £999 for Arc users. Contact Acorn on (0223) 254200.

SCSI SHARE LOADS FASTER

IF YOU are running a cluster of Archimedes and/or BBC A3000s and are tired of waiting for applications to load through your network, Lingenuity has a solution.

SCSI Share is a low-cost way of connecting small groups of Arcs and A3000s to a single hard disc drive, which dramatically speeds up access to applications. All connected computers can even load the same application simultaneously. Files can be transferred up to 64 times faster than Econet.

Ideally, four or five computers can share one hard disc drive, although SCSI Share can support up to seven computers if cable length permits. The package appears to the user as two hard drives – the first is read-only and protects the application software, while the second is a read/write section, providing work space and storage.

Standard SCSI interfaces are used, and Lingenuity can also upgrade your computers to standalone drive systems if required. For current Econet network users, use can be made of Econet's flexibility, so work/files can be sent to fileservers.

The price of £999 is for a cluster of five units and includes interfaces, a 40Mb hard drive, cables, management utilities and installation. Contact Lingenuity, Wood Farm, Linstead Magna, Halesworth, Suffolk IP19 0DU. Tel: (0986) 85477.

BBC ACORN USER SHOW '91

THINGS are really hotting up for the BBC Acorn User Show, which takes place from October 11 to 13 at London's Wembley Conference Centre.

Over 60 leading exhibitors from the Acorn market will be attending the show and it will be your opportunity to see all the latest hardware and software.

The show will get off the starting blocks with the help of several sporting personalities – watch this space for more details. Below are just some of the features that will be on offer at the show.

- In the show theatre there will be a display every half-hour covering a variety of technical, computer-driven presentations. With the emphasis very much on entertainment, you will be able to hear about all the latest developments in the Acorn market from leading experts.
- A workshop/clinic area will include a series of helpful instructive demonstrations of the latest hardware and software. Experts from both Acorn and BBC Acorn User will be on hand to offer you helpful advice.
- The show will be a major launch pad for new and exciting games for the Arc, and the special games arcade will be your chance to try them at first hand.
- The editorial team of BBC Acorn User will be running an Arc-based desktop publishing system to show visitors how we produce the magazine each month. In addition, there will be a special team of young newshounds who will be beavering away on a daily newsletter uncovering all the activities at the show.
- Special offers and competitions will be featured at the show – watch out for further details in the next issue.

If you would like to save money on tickets, why not apply now? Prices are £5 for adults, £3 for under 16s (under fives are free) and £13 for family tickets (two adults and two children). Tickets will also be available on the door at £6, £4 and £16 respectively. Apply to: Safesell Exhibitions Ltd, Market House, Cross Road, Tadworth, Surrey KT20 5SR.

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- 'Mastering the Wimp' — series on Wimp programming
- 'Under the Lid' — hardware series
- 'Assembler Workshop' — all about ARM Assembler
- 'Beginning 'C' — series on C language
- 'DTP/WP' — advice on using commercial software
- 'Arcade' — a round-up of the latest games

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PROGRAM DEVELOPMENT NOW EASIER IN RISC OS

A NEW generation of programming language packages, which will enable program development entirely within the Risc OS desktop, has just been released by Acorn.

The packages – *Desktop C* and *Desktop Assembler* – consist of a large set of Risc OS applications (19 in C, 17 in Assembler), forming a complete desktop development environment for programming.

The products can be used together for mixed programming and the applications are backed up by extensive user guides and program examples.

There are 15 tools common to both products which may also be used in further language products – a hint that this development environment is designed to be extendable by both Acorn and third parties.

The tools included in both *Desktop C* and *Desktop Assembler* are specifically designed to:

- Debug Risc OS desktop applications at source or machine level
- Edit program source and other text files mechanically
- Compile and assemble source code
- Construct programs efficiently under the control of makefiles, set up from a simple desktop interface
- Squeeze finished programs to occupy less disc space
- Constuct template files for Risc OS applications

Each product contains installation, boot, work and reference discs, reference cards and user guides. A release note is supplied with each including information not covered in the manuals – eg, additional installation points, pitfalls to avoid and language implementation changes.

Software tools, all operating with fully windowed interfaces, include: *Install*, an application to automatically prepare a working directory on the user's machine; *DDT*, a windowed debugger; *FormEd*, an improved version for producing the templates resource file of each application; *Make*, for constructing programs under the management of 'recipes' stored in the makefiles; and *ScrEdit*, a text editor derived from *Edit* with features for constructing program source and text files.

In addition, the Ansi and Risc OS specific C libraries are slightly enhanced.

A new front end relocatable module is supplied with both products which provides a windowed desktop interface for a large category of non-interactive command line tools. This provides developers with a fast and easy method of implementing some desktop applications.

For further information contact Acorn Computers on (0223) 245200.

NETWORK SAVER

SCHOOLS can save over £2000 on their network installation with a new pack from Acorn.

The Archimedes Cluster Network consists of a complete Econet system, together with four or eight 2Mb BBC A3000 network stations. It also contains an Archimedes-based fileserver and a network manager's station.

The Acorn *Level 4 Fileserver* is used to help manage the system, which also comes with a choice of user-specified software packages.

These include wordprocessing, desktop publishing, spreadsheet and database applications, as well as a BBC model B emulator.

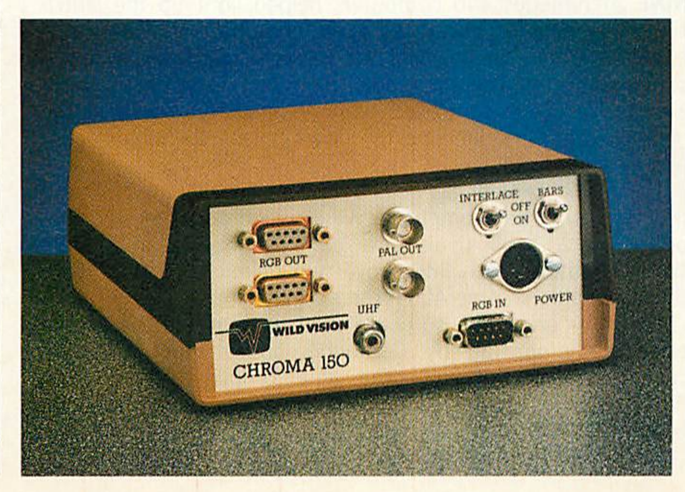
Prices start from under £7500 for the four-station network. The cost includes installation, training and one year's support. Contact Acorn on (0223) 245200.

CHROMA PAL VIDEO LINK

IF YOU use your computer for teaching, or creating presentations, then the Chroma 100 series PAL coders from Wild Vision could provide you with the missing video link.

A PAL coder converts RGB output from your computer or any other RGB source to high-quality PAL-coded composite video. Applications include computerised data presentation, such as pie charts and tables, being incorporated into teaching videos, and computer-generated animated sequences being combined with live video.

Contact Wild Vision Ltd, 15 Witney Way, Boldon Business Park, Boldon Colliery, Tyne and Wear NE35 9PE.



NEWS IN BRIEF

- **MINERVA**, the Exeter-based software house, has decided to expand its local computer training courses to include Archimedes-related software. Minerva Training provides a range of structured courses covering, among other things, Impression, Pipedream, Multistore, Timetabler and Atelier. Archimedes Awareness courses are also being run for the new user. For more information contact Minerva Training on (0392) 426160.
- **DUE TO** the increase in sales following its decision, in 1989, to concentrate solely on educational material for the Archimedes, 4Mation is moving to larger premises. Its new address is 14 Castle Park Road, Barnstaple, Devon EX32 8PA. Tel: (0271) 25353.
- **FOR ARCHIMEDES** users who live in the West Midlands, help may be closer to hand than you think. Tired of PC dealers ignoring the needs of the Archimedes market, Ken Thomas has started up his own company, Pyramid Computer Services, in Stourbridge. For more details contact Ken on (0384) 396739.
- **ATOMIC** Software is the new budget software label for the Archimedes/A3000 market which aims to make high quality games with a retail price of £9.95. It is now looking for games to publish. If you have written a game with excellent presentation and superb graphics, and are looking for a publisher, then send your disc to Atomic Software, 6 Manor House Street, Peterborough PE1 2TL. All submissions will be treated with confidentiality and are guaranteed a swift reply.
- **TO THOSE** of you around the world who have written to us with information about user groups in your area, many thanks. We are currently constructing a library of such groups and intend to publish contact numbers and addresses in a forthcoming issue. So, if you haven't already, please write to us with details of your group, including dates of any forthcoming events.
- **BEEBUG** has added three new fonts to its Outline Font Pack. The new pack costs £47.39. Users of Beebug's DTP package, Ovation, can upgrade to the full font set for £7.50. For more details contact Beebug on (0727) 40303.



MAP CURRICULUM USING GENESIS 2

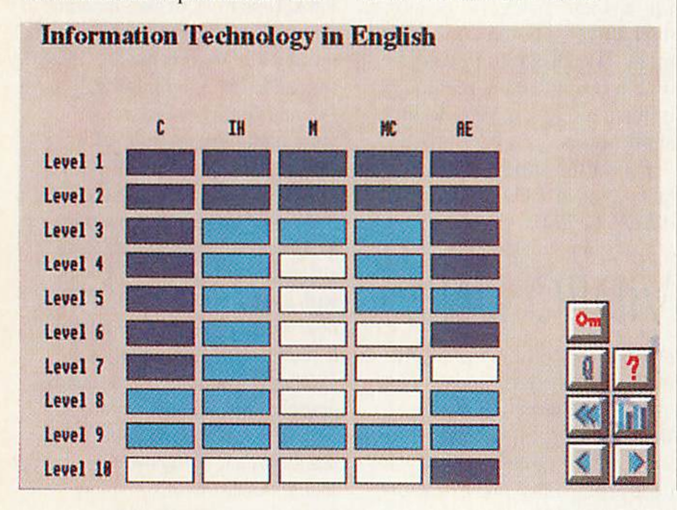
EDUCATIONALISTS looking for help in analysing the information technology requirements of the National Curriculum now have some help from a new application.

MapIT by HM Associates is designed as a *Genesis 2* application and enables teachers to examine the contribution that IT can make to NC subjects. It contains a pre-existing analysis which can be modified and subsequently printed out according to each individual's perceptions.

The application is not only useful for individual teachers, but also provides a powerful tool for both departmental and school in-service activities focusing on IT requirements.

MapIT runs under the *Genesis 2* browser which is distributed with the package. Therefore *Genesis 2* is not required to make use of this package, although *Genesis 2* users will be able to make significant alterations as appropriate. The application does run on a 1Mb Archimedes, although it is more effective when used on a 2Mb machine.

MapIT costs £32, and bulk purchases and LEA licences are available. Contact HM Associates, 40 Hylton Road, Newton Hall, Durham DH1 5LS. Tel: 091-384 1874.



PC CONNECT FOR ARC

UNTIL NOW Archimedes and A3000 owners have had only two options if they wished to run IBM PC packages – they could either use the PC Emulator or buy a complete PC-compatible.

David Knell of DT Software decided it would be a good idea to add a PC clone to the Archimedes and have them sharing peripherals – ie, the hard disc drive, monitor and keyboard, so that the printer would not have to be repeatedly unplugged.

The PC Connect card allows this peripheral sharing by means of a high speed parallel link between the machines. It allows:

- The Archimedes to use a partition on a PC hard drive as an Arc hard disc
- The PC to use a 'PC Emulator' file on an Archimedes hard drive as its hard disc
- The Arc keyboard and monitor to be used by the PC
- The Archimedes serial and parallel ports to be used by the PC for printing and comms

The hard disc functions will run over a network, and the PC can use an Econet fileserver as a hard disc.

The PC Connect card costs £169.95 and is available from DT Software, Freepost, Cambridge CB3 7BR. Tel: (0223) 841099.

PICTURE THIS

SOLITAIRE's PC Picture Kit is a portable and simple method of capturing and producing images for manipulation within a desktop publishing package. Rather than being recorded onto film, the image is digitised.

The kit uses the Canon Ion still frame video camera as its base and costs £1250. Versions are available for the Archimedes and A3000.

For more details contact Solitaire at 6 The Quay, St Ives, Cambridgeshire PE17 4AR. Tel: (0480) 495608.

ARCS LIGHT UP THE SKY

NINE Archimedes 440 computers helped light up the Dutch sky at a recent concert by rock composer Vangelis. The computers were at the heart of a spectacular laser system – sitting on top of 18-storey tower blocks on Rotterdam's North Island. The 440s controlled scanner amplifiers to drive the motorised mirrors directing the lasers onto enormous screens and white blinds.

The music by Vangelis emanated from a barge anchored in the river and the computers were linked together by telephone data lines to ensure each laser was in perfect synchronisation. Each 440 drove two pairs of scanners, with the lasers placed some 400 metres apart.

The laser projection software used to generate the special effects was written by Cambridge-based product design company, Micro Robotics – the same company that designed the control equipment fitted into the shells of the Teenage Mutant Ninja Turtles.

For further details contact Acorn on (0223) 245200.

NEWS IN BRIEF

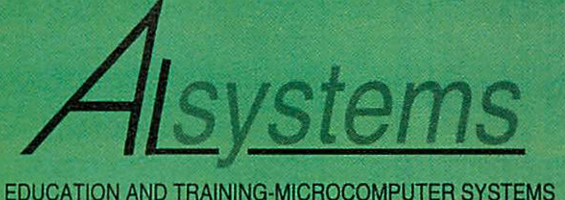
- **AT ONLY** 1.9lb, Toshiba claims that its new portable printer, the Express Writer 201, is the lightest on the market. The printer can be powered from the mains as well as by battery, and will print for one hour using its removable battery. This 24-dot thermal transfer printer will print on special thermal paper or, using a ribbon, on standard office paper to give full letter quality output. The printer will be available in mid-July, at the not-so-tiny price of £325. For more information contact Toshiba on (0932) 841600.
- **VISITORS** gathered on a rainy Sunday recently at London's Mill Hill school to participate in the second A3000 Owners Club open day. Our own technical assistant, Paul James, was on hand to give help and advice. The inimitable Mike Beecher from EMR was also there to demonstrate the latest version of Studio 24 and a new sound sampler. Anyone interested in joining in or finding out about the next open day should send an sae to: Club A3000, 48 Michleham Down, London N12 7JN.
- Around 40 avid Arc users attended the inaugural meeting of the Jersey Archimedes User Group. Organised by Bob Basford, the advisor for IT in Jersey. The new group is set to meet every four weeks at the Quennevais Secondary School in Jersey. Organised under the auspices of the Jersey Computer Association and supported by Jersey computer dealer, Computer Focus, the group is interested in hearing from prospective new members. Contact Bob Basford on (0534) 89849, or Peter Mountford of Computer Focus on (0534) 67870.

DIARY DATES

- **JULY 10-14** The International Music Show will take place at Olympia, London. The first two days are for trade only, and the last two days are for the public. July 12 is designated Education day.

There will be a piano hall, live entertainment, and a 'learn to play' centre. Admission costs £6, £3.50 for under 14s.

- **OCTOBER 11-13** The BBC Acorn User show takes place at Wembley Conference and Exhibition Centre in London (see page 7).



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ABBREVIATIONS

Ace	Ace	Col	Colton	Mid	Midnight Graphics
Aco	Acorn	ComT	Computer Tutorial	Mit	Mitre
Apr	Apricote	Dat	Data Store	Min	Minerva
Arm	Armadillo	Dig	Digital Services	Oak	Oak
Arn	Arnor	Eiz	Eizo	Pil	David Pilling
Arx	Arxe	Emr	EMR	Ser	Serial Port
Aut	Autodesk	Gra	Graphics Factory	Sil	Silicon Vision
Bai	Baildon Electronics	Hum	Human-Computer	Sim	Simtron
Bee	Beebug	Ico	Icon Technology	Spa	Spacetech
Cal	Calligraph	ICS	Ian Copestake	Sta	Star
Can	Canon	Ife	IFEL	Sup	Superior Software
CC	ComputerConcepts	Iot	Iota	Tec	TechSoft
Cha	Chalksoft	Irl	Irlam Instruments	Wil	Wild Vision
Cir	Circle	Kad	Kador	4ma	4Mation
Cit	Citizen	Lin	Lingenuity	4th	Fourth Dimension
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Logo	Lon	£55
Magpie	Lon	£48
Maps and Landscapes 1	Cha	£19
Maps and Landscapes 2	Cha	£19
Mark Master	Cha	£67
Master Break	Sup	£15
Mogul	Ace	£17
Movaword	Cha	£17
MultiFS	Arx	£28
Multistore version II	Min	£197
Nevryon	4th	£15
Note Invaders	Cha	£17
Numbers and Pictures	Cha	£17
Numerator	Lon	£65
Numerator Chaos	Lon	£18
OCR	Irl	£155
– bought with Irlam scanner		£79
Office Tools	Sil	£276
Olympics	4th	£15
Orrery	Spa	£85
Ovation	Bee	£79
Pendown	Lon	£49
– Extra Outline Fonts	Lon	£16
Personal Accounts	Apr	£23
PIPEDREAM 3 ✓	Col	£108
Pirate	Cha	£17
Poster	4ma	£77
Powerband	4th	£19
Prehistoric Animals P	MicS	£16
Premier	Cir	£71
– DataBase	Cir	£25
– WordProc	Cir	£25
Presentation System	Sil	£61
Presenter Story	Lin	£145
Presenter II	Lin	£36
Printer Driver, RISC OS	Ace	
– Epson / Star / Citizen colour		£13
Printer Driver, RISC OS	Bee	
– Epson / Star colour		£13
Pro Artisan	Cla	£72
Professional PDT CAD	Oak	£353
Protext	Arn	£114
Puncman 1 and 2	Cha	£17
Puncman 3 and 4	Cha	£17
Puncman 5 to 7	Cha	£17
QuicKey	ICS	£10
Real McCoy	4th	£24
Real McCoy 2	4th	£24
Realtime Solids Modeller	Sil	£138
Render Bender	Cla	£58
Repton 3	Sup	£15
Revelation	Lon	£64
Reversals	Cha	£17
Rhapsody 2	Cla	£50
RiscBASIC Compiler	Sil	£112
RiscForth Compiler	Sil	£112
RISC OS Companion Vol 1	Oak	£49
RISC OS Programmer's Reference Manual	Aco	V0 £75
RISC OS Style Guide	Aco	V0 £11
RoboLogo	Sil	£75
SCHEMA ✓	Cla	£91
School Administrator	Min	£69
Score PMS	Emr	£499
ShareHolder	Sil	£139
ShowPage	CC	£125
Sigma Sheet	Min	£53
Snippet	4ma	£26
SolidCAD	Sil	£109
SolidsRender	Sil	£109
SolidTools	Sil	£278
Spark	Pil	£5
Speech!	Sup	£15
Spelling - week by week	Cha	£19
Splice	Ace	£24
Squirrel	Dig	£129
– Econet or site licence		£516
Studio 24 Plus	Emr	£149
Super-Dump	Sil	£24
Superior Golf	Sup	£15
Super-Plot	Sil	£31
System Delta Plus II	Min	£54
Timetabler	Min	£575
Timewatch	Mit	£23
Toolkit Plus	Cla	£37
Tools Graphics D	MicS	£24
Touch Type	Iot	£41
Tracer	Mid	£46
Tracker	Ser	£38
Tween	Ace	£24
TWO (Task and Window Organiser)	ICS	£19
– site licence		£60
Utility Disc 1	Dat	£13
Utility Disc 2	Dat	£13
View»Mac 3	Hum	£65
– Arc/Mac Cable		£24
Wimp Game	4th	£15
Words and Pictures	Cha	£17
World Geography Maps D	MicS	£24
World Wildlife P	MicS	£16
Zarch	Sup	£15
1st Word Plus	Aco	£67

PRINTERS

ArcLaser	Cal	£906
Bubble Jet BJ-10e	Can	£276
– Sheet feeder		£54
Bubble Jet BJ-300	Can	£399
Bubble Jet BJ-330	Can	£469
Laser Direct Qume	CC	£856
Laser Direct LBP-4 Card	CC	£323
LASER DIRECT LBP-8 ✓		
8 ppm 600 dpi incl toner	CC	£1280
LBP-4 4 ppm	Can	£750
LC24-10 32k ram card	Sta	£61
Swift 24 Colour	Cit	£279
New Canon Toner cartridge		£65
Archimedes parallel printer cable		£8

FUNCTION KEY STRIP ORGANISER

Arckey	ICS	V0 £3
– quantity of 4		V0 £10

MEMORY, ARM3 ETC

Fitting extra unless stated
† Fitting is straightforward
‡ Fitting requires expertise

A3000 2Mb †	Ife	£69
A3000 4Mb †	Ife	£243
A310 4Mb †	Ife	£298
ARM3 ‡		£400
4-slot 4-layer Backplane	Ife	£57

MICE, MONITORS

Clares Micro Mouse	Cla	£26
9060S	Eiz	£450
9070S	Eiz	£640

SCANNERS, DIGITISERS

ArcScanner including Epson GT-4000	Cla	£1750
Hawk V9	Wil	£330
– A3000 version		£390
Image (colour)	Irl	£589
i-Scan 200	Irl	£539
i-Scan 400	Irl	£589
Scan-Light A4	CC	£346
– as above + Sheet Feeder		£432
Scan-Light Junior	CC	£175
– A3000 version (internal)		£175
Scan-Light Junior 256	CC	£210
– A3000 version (internal)		£210

INTERACTIVE MULTIMEDIA

Commodore CDTV (CCD 1000) including Encyclopaedia		£499

ideA HARD DISC PRODUCTS

SUMMER BARGAINS!

And even lower summer prices for Education – please enquire

The number at the end of a product name is the capacity in megabytes. An L indicates a 1 inch high disc: two of these may be fitted in the same cradle or external case, sharing the same controller card. An S indicates a 2½ inch wide disc mounted directly on the controller card.

Our 'upgrades' are fully guaranteed and include the ideA controller card, a fan (where needed), and everything else you will require. A backplane is optional with the A310 internal upgrade, but if you do use one it must be a four-layer type.

A300/400/500 internal upgrade

IDEARCIN20S	23ms	£475
IDEARCIN20L		£209
IDEARCIN40	28ms	£269
IDEARCIN40L	25ms	£309
IDEARCIN80L	19ms	£389
IDEARCIN120L	19ms	£549
IDEARCIN200	15ms	£839

A300/400/500 external upgrade

(May also be fitted to A3000 external expansion slot using a podule case or racking system)

IDEARCEX20L		£345
IDEARCEX40	28ms	£395
IDEARCEX40L	25ms	£449
IDEARCEX80L	19ms	£499
IDEARCEX120L	19ms	£699
IDEARCEX200	15ms	£935

A3000 fully internal upgrade

IDEA3IN20	23ms	£375
IDEA3IN40		£575
IDEA3IN60		£POA
Fitting if required		£35

A3000 external upgrade

(*External* drive using *internal* expansion slot; can combine with PRES Disc Buffer Board)

IDEA3EX40 etc
– prices as IDEARCEX40 etc + £10
Fitting if required £35

Additional hard discs

IDEA40L	40Mb	25ms	£219
IDEA80L	80Mb	19ms	£309
IDEA120L	120Mb	19ms	£459

A3000 accessories

IC PLINTH **SPECIAL! ☆ £18**

ideA controller cards and accessories

(For use with your own IDE hard discs; we can only accept responsibility for performance with discs we have tested ourselves)

IDEARCIN Archimedes Intern	£110
IDEARCEX Archimedes Extern	£140
IDEA3EX A3000 External	£140
Internal hard disc cradle kit	£15
Fan kit (Standard)	£10
Case with power supply & fan	£125
Fan kit (A3000 Internal)	£15
Cable for second hard disc	£5

Recommended for backing up
Beebug Hard Disc Companion £35

Recommended for ease of use
ICS Task & Window Organiser £19

Tel 051-632 1234

Beware of hidden or missing extras, such as fans, when comparing hard disc prices

AT LEAST £100 OFF *hard disc prices when bought with a computer* **!**

ICS FONTS

1st Word Plus **First Fonts**
PipeDream **PipeDrivers**
Wordpower **Power Fonts**

Please ask for details of our range of Symbol Sets and Typefaces for most printers. For example:

Star LC-10 typefaces
Black, Caldy, Outline, Pensby, Raby, Shadow, Universal £19

PipeDriver Dot 1
For dot matrix printers with more features than PipeDream knows what to do with – provides access to resident and download fonts, ink colours, variable print size and line spacing etc £10

ODDULES

AnDi	Bai	£49
Oddule Adaptor (needed with your first Oddule unless you have an I²C socket)	Bai	£8

KEYBOARD COVERS

Seal 'n Type (spill-proof)		
– Archimedes	Kad	£14
– A3000	Kad	£14

From our postbag

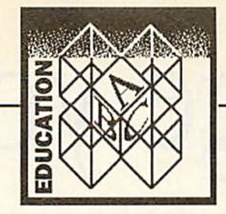
"As a recent purchaser of TWO, may I say how delighted I am with it. Life with 'Archie' has suddenly become much simpler!"

"Just received TWO – marvellous for time saving."

"TWO is the best thing I've ever bought!"

"DrawBender – an excellent tool. As though I've suddenly come across a new and unexplored area, very refreshing."

E&OE SO36 91JE21



A SHINING EXAMPLE

OVER THE last year the software company, Brilliant Computing, has received awards for both services to the mentally handicapped, and for publishing some of the best audio visual materials for this user group. Brilliant's Nick Pronger sees these awards as a recognition of the important part computing can play in improving the quality of life for those with special needs.

The company is still developing its material for the BBC/Master series of computers, including packages to encourage discussion and decision-making.

However, along with many other companies, Brilliant is directing its newer developments towards the A3000/Archimedes market, realising the potential of this range for educational packages.

Ultimately the success of any piece of software for people with disabilities and learning difficulties depends on the hardware platform. Impressed by its ability to produce the superior graphics and sounds needed to motivate special needs users, Brilliant programmer Rod Boyes is rewriting some of the more popular titles specifically for the A3000.

Touchscreens make computing easier for people with special needs, and a wider choice is now available.

Microvitec has adapted its Touchtec 510 for use with the Archimedes. The new version, called Touchtec 3000, fits the Microvitec M3000 monitor and has its own power supply. It comes with a package of nine Brilliant programs and costs £300. Microvitec can be contacted on (0274) 390011.

Another company, Sherlock of Norway, has developed a transparent perspex screen called Touch Window, designed to fit any monitor. It does not require as much pressure as a Concept Keyboard, and costs £260. For further information contact Keyboard Technologies, the main UK dealers, on (0509) 610706.



THE TOUCHTEC 3000 FITTED ONTO THE M3000 MONITOR

To use either the Touchtec 3000 or the Touch Window on an A3000 you will need a serial upgrade (AKA18), obtainable from your local dealer.

For further details contact Brilliant Computing at PO Box 142, Bradford BD9 4BR. Tel: (0274) 578239.

DESKTOP FOLIO

ESM held an official presentation last month at NCET's offices to mark the recent launch of *Desktop Folio*.

Ysanne Heald, ESM's divisional director, has no doubts that schools will find *Desktop Folio* a well designed and complete publishing resource which can be used widely throughout the curriculum. Her confidence in the package is shared by Durham Microtechnology Centre which has purchased a copy of the package for each primary school in its authority.

Desktop Folio, which offers wordprocessing, desktop publishing and 'interactive capabilities' all rolled into one, is a microworld for writing and design, 'limited only by the imagination of the user'. At present only one style can be inserted into each frame, but version 1.2, due out in September, will allow users to incorporate multiple styles within a single frame.

A Christmas pack, assembled by Des Thomas, will also be released in September, comprising specially designed stationery templates and ideas for Christmas projects. For more details contact ESM, Abbeygate House, East Road, Cambridge CB1 1DB. Tel: (0223) 65445.

RESULTS SERVICE

From August 15 to 23, BBC Radio 5 will be broadcasting Student Helpline – the only official exam results advice service endorsed by PCAS and UCCA – to advise students who have just received their A level, Scottish Highers or BTEC examination grades. The programme, to be broadcast nightly at 9.30pm, will cover topics as diverse as oversubscribed courses, studying in Europe, accommodation and loans.

On August 23 at 11.30am, there is a special programme discussing the opportunities open to students who have just received their GCSE results.

For those who want confidential advice, a helpline will be open on (0345) 909693, offering information and counselling on course and training vacancies, job opportunities and student finance. The lines will be run by the Careers Service and the National Union of Students. They will be open between 1 and 9pm during the exam period. Calls will be charged at local rates.

On behalf of UCCA and PCAS, Tony Higgins, Chief Executive of PCAS said 'Post exam time is a period of great stress for school leavers. A combination of accurate information and skilled guidance is essential if school leavers are to make the best of their lives.'

Sharon Halpern

NEWS IN BRIEF

● **LONGMAN LOGOTRON** has released two titles in its Landmarks series which explores history through a computer package. Rainforest and The Victorians are available for the BBC A3000/Archimedes, and each package costs £19. For further details contact Longman Logotron, Dales Brewery, Gwydir Street, Cambridge CB1 2LJ. Tel: (0223) 323656.

● **TWO ART** packages for the A3000/Archimedes series of computer are Imagine and Prime Art.

Imagine is a design package from Topologika. Incorporating twin screens, built-in maths facilities and many unusual features it can be used widely across the curriculum. It runs on an A3000/Archimedes with 1Mb and costs £34. Contact Topologika at PO Box 39, Stilton, Peterborough, Cambridge PE7 3RL. Tel: (0733) 244682.

Prime Art from Minerva Software has been designed for use by primary and special needs children. Of particular interest to users will be the Undo button and the way that pictures are stored on disc in compressed format. It costs £79.95, and is available from Minerva Software at Baring Crescent, Exeter EX1 1TL. Tel: (0392) 437756.

● **MULTIMEDIA** production company, East South West Video Works, has released Midi Basics, an educational video for secondary school teachers and students alike. It covers a wide range of Midi-related topics, from adding a note to sampling and mixer automation, and portrays just how a song is created using the latest technology. The pack, which includes the video and a set of teachers' notes, costs £27.99. For more information contact ESW Video Works, 58 Scotts Lane, Shortlands, Bromley, Kent BR2 0LX. Tel: 081-460 1773.

● **SCIENCE STUDENTS** are finding that it is no longer enough to simply learn the facts, as GCSE requirements stress the importance of problem solving skills and the use of knowledge. Chemistry Super Star aims to help students with their practical work.

Consisting of a number of games based on various chemical reactions it is ideal for both revision and safe experimentation! It costs £22 and is available from Chalksoft Ltd, PO Box 49, Spalding, Lincolnshire P11 1NZ. Tel: (0775) 769518.

Turbocharge your Network

Since completing development work on Econet Level 4 for Acorn, our Network Development team has devoted its attentions to the remaining problems concerning the use of Archimedes on Econet, namely, the delivery of large applications quickly into machines, efficient network printing and effective application management in the classroom.

Our solution, CLASSROM, includes a local high speed applications server on each machine for maximum performance and versatility. It will be available from September, but to whet your appetite, here are just a few of the outstanding features of our new system:

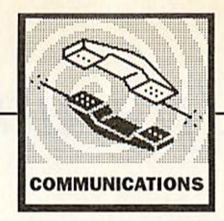
- ❑ Full Network facilities - not simply a shared hard disc system.
- ❑ Utilises your existing Econet cabling, file servers and interfaces, AND leaves the A3000 internal expansion bus free for User/Analogue ports etc.
- ❑ Full security system to protect applications from being tampered with.
- ❑ In recent tests we loaded !Impression simultaneously into 10 machines in only 5 seconds.
- ❑ Does not tie up an Archimedes as a dedicated master machine.
- ❑ Allows remote starting of applications from a master machine to ease setup at the start of lessons.
- ❑ Substantially better performance than Ethernet or shared hard disc systems.
- ❑ Minimum available application delivery bandwidth of over 6 Megabytes/second on a 10 station network - a figure that INCREASES with the addition of extra stations.
- ❑ Allows machines to be remotely configured, reset and tidied up at the end of each lesson.

If you are interested in Archimedes on networks, do not miss this exciting solution to your problems.

with CLASSROM



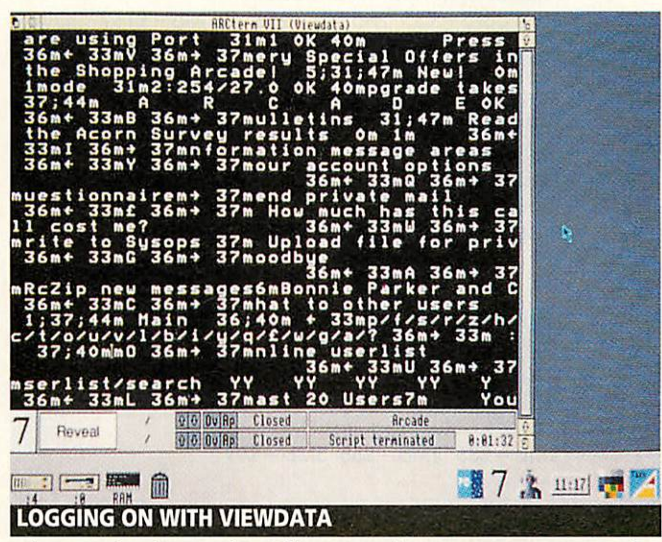
Oak Solutions Cross Park House Low Green Rawdon Leeds LS19 6HA Tel: 0532 502615 Fax: 0532 506868



DEMYSTIFYING CROSSED LINES

SO, YOU'VE just been given the number to a new bulletin board, you eagerly log on and... nothing. Alternatively the modem hangs up on you, prints random characters on the screen or just refuses to behave. Rest assured – this is quite a common problem, particularly if you are new to communications, or if you don't know which setting the BB at the other end is using.

Help is at hand with my handy guide to getting on-line. However, I am assuming that you have got your comms program up and running, with your modem plugged in and waiting to be told what to do.



LOGGING ON WITH VIEWDATA

There are generally four things to remember when logging onto a new BB – parity, word length, stop bits and type of terminal. Do these words leave you wondering why you ever decided to get involved in comms? Well I won't confuse you by explaining them in great detail, but I will just tell you the most common values to try in order to get you logged on correctly.

The major thing to decide upon is whether the BB you are calling is scrolling or viewdata/Prestel. Scrolling means that the text has 80 columns and (logically) scrolls up the screen as you use it, viewdata systems use mode 7 teletext style graphics. The terminal type is the most important thing to get correct when logging on as it affects the other settings you must use. If you don't know which type of terminal to use, try scrolling, changing to viewdata if you get lines of gobbledegook on connection.

Scrolling mode usually uses no parity, eight bits word length and one stop bit, referred to as 8N1, whereas viewdata is a seven bit system using even parity and one stop bit, referred to as 7E1. That's really all there is to it – 8N1 for scrolling and 7E1 for viewdata. Another thing that sometimes causes confusion is the RETURN key. In scrolling this acts as you would expect – it takes you to the next line, whereas viewdata tends to like the # key instead of RETURN. You should make a note of this before you start dialling the number as quite a few BBs support both scrolling and viewdata access. Which you get is determined by whether you press # or RETURN at the log on prompt. Make sure that your RETURN key is set accordingly before you actually type anything. If your computer is set to viewdata and the BB at the other end sees you press RETURN, it will go into scrolling mode, which will have all the wrong settings and generally mess up the screen.

Lastly, it is worth checking the speed to which your modem is set. Most modern modems will automatically detect the optimum speed depending upon what they find at the other end, allowing you to just talk to the modem at, say, 2400/2400 baud. However some bulletin boards only support limited speeds and a great many people have manual dial 12/75 modems. An indication of connect speed can be gained from the noises your modem makes when you log on. If your modem is an automatic one, you may find that logging onto a 12/75 BB will provide about three or four different tones and then drop the line. This is usually due to the fact that fast, flashy modems don't always like 12/75 on auto. Therefore you may need to manually force the modem to connect at that speed, if you are sure that the BB at the other end is 12/75.

Please let me know about any specific problems you encounter and I will try to explain them in future issues.

A STAR IS BORN

A new bulletin board has been started by Eaton School, Norwich. Called Star-Net it is available 24 hours a day on (0603) 507216. Supporting Ansi scrolling, it caters for BBC and Archimedes users, in addition to having an extensive on-line database area.

Running on an Archimedes using *ArcBB* software, its aims are to provide an on-line inter-school link between all Norfolk Schools. Calls from other schools around the UK, Europe and beyond are welcomed. Pupils and general users can log on and read or download text on a multitude of subjects, ranging from computing to local history, and ecological issues.

WE HAVE A WINNER

After sorting through a sack of mail for the *Arcterm7* competition, it is my pleasure to announce the winner. A copy of *Arcterm7*, together with sound samples, will be winging its way to Gareth Hudson of Bangor. Congratulations to him! Hugo Fiennes runs the successful World of Cryton BB on (0749) 679794/670030.

Paul Vigay

NEWS IN BRIEF

● **IAN JONES** and Hugo Fiennes are working on an extension to the Ymodem batch header blocks, to allow users of ArcBB software to preserve Archimedes filetypes when downloading. This should eliminate some of the problems encountered when you download a file, not knowing if it's archived. The method of implementing this is simple. Ymodem batch uses a 128 byte header block, of which bytes 124 to 127 consist of what is known as a 'capability' word. Currently only bit 0 of byte 124 is used, as it tells the computer what the two preceding words do – they execute and load addresses respectively. Under Risc OS, these also encode the filetype and modification date.

Future versions of TASKansi, Arcterm7 and ArcBBs should incorporate this feature, so if you're writing any comms software contact Ian (via Cryton).

● **THERE WAS** an error in the June column. Though full Xmodem and Ymodem protocols are supported by ArcComm2, Zmodem is not.

● **FOR £86.96** you can save on phone bills, with a Smart Socket from Mercury, which plugs into your existing BT telephone socket and mains. You plug your phone into the Smart Socket, and calls are automatically directed via the cheapest route. Local calls still go via BT, but long distance/international calls will be diverted along the cheaper Mercury network. This will result in savings of up to 15 percent on long distance calls.

In addition, you will receive fully itemised, and exact time billing. However the Smart Socket only works in areas currently covered by the Mercury Network. For more details and a full list of exchanges contact Intercom Nottingham Ltd on 0800 626474.

● **ACOM,** a new multi-tasking viewdata emulator, has arrived from Holland. It supports extensive editing facilities for mailbox frames and Prestel style screens, and incorporates a teletext mini art package. This includes 48 scalable fonts and colour patterns in addition to Ansi, VT and TTY emulations. In terms of viewdata support it is the best comms package yet for the Arc. Contact ECD Computers Delft, Voldersgracht 25-26, 2611 EV Delft, Holland. Tel: 31-(0)15-147643.

The Complete Upgrade Solution



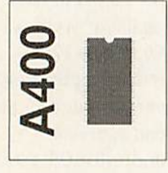
- Uses only eight RAM devices
- User upgradeable from 1 to 4 Mb
- Four layer printed circuit board
- Low power consumption
- Available without RAM devices

Bare card – £35 2nd Mb – £56 4th Mb – £159



- Includes MEMC1a upgrade
- Large capacity OS ROM sockets
- No soldering required
- Four layer printed circuit boards
- Courier collection of your machine

2nd Mb – £225 4th Mb – £299



- 400 series RAM upgrade kits
- Supplied with full fitting instructions
- 410/1 to 420/1 requires 1Mb
- 420/1 to 440/1 requires 2Mb
- 410/1 to 440/1 requires 3Mb

1Mb – £35 2Mb – £65 3Mb – £99



- Uses only eight RAM devices
- Suitable for A440, A400/1 & R140
- Fully RISC OS compatible
- Four layer printed circuit boards
- Courier collection of your machine

8 Mb upgrade – £649



- New series Aleph One ARM3
- 3 to 4 times performance increase
- Surface mount technology
- Four layer printed circuit board
- Courier collection of your machine

ARM 3 upgrade – £399



- Increases resolution with all Multiscan monitors
- Doubles desktop work area
- Custom modes for Taxan and Eizo monitors
- Suitable for all Archimedes computers
- Free with any multiscan monitor from Atomwide

Atomwide VIDC Enhancer – £29



- Syquest removable disk systems
- Including one cartridge, drive unit and all cables
- 42Mb removable cartridges
- High-flow fan fitted for improved cooling
- Please phone for prices on other SCSI related products

Atomwide Syquest drive unit – £470 42Mb disks – £64





- All products are cross-compatible
- Combination deals available on all products
- Typical combination A310 4 Mb and ARM3 – £675
- Dealer enquires welcome
- Phone for full details on all products

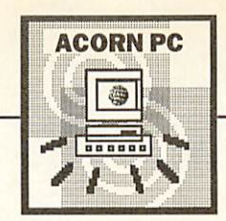
All prices exclude VAT at 17.5% but include delivery







23 The Greenway Orpington Kent BR5 2AY Tel 0689 838852 Fax 0689 896088



SETUP YOUR PC AND GO

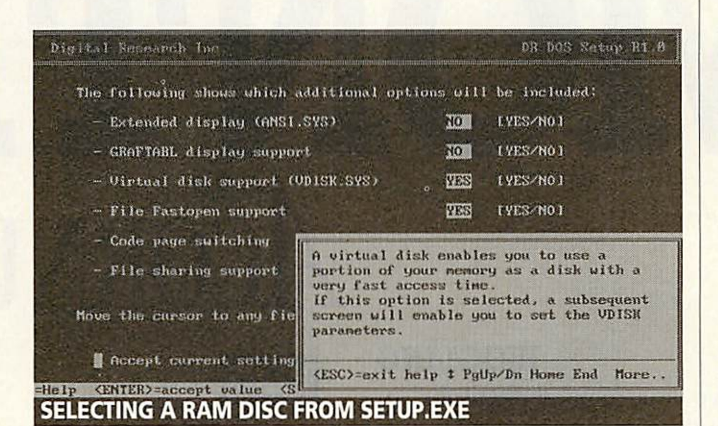
WHEN YOU start up an Archimedes/A3000 the setup is determined by the command script in the Boot file. In the PC environment the setup is performed by two files, CONFIG.SYS and AUTOEXEC.BAT. The CONFIG.SYS file deals with the drivers and other resident programs that are installed before the command processor, the program which provides the commands of Dos. The AUTOEXEC.BAT file takes over once the command processor has been loaded and can install further resident utilities or run an application.

Normally you'd have to edit these two files yourself with an Ascii text editor like *Edlin* or *Edit*. However if you've bought an Archimedes/ A3000 with DR-Dos rather than MS-Dos there's an undocumented utility called SETUP.EXE which can do much of the work for you. Run this program and you are led through the main aspects of the PC emulator setup that you might want to change. At each stage you're offered a number of options which can be switched on or off. Each option is also covered by a help screen, accessed by pressing F1.

There are several useful options that can be selected at this stage, such as the VDISK utility which creates a Ram disc within the PC environment. This speeds up the operation of some PC programs by storing program overlays and frequently used files in Ram rather than on the hard or floppy drive. Once the configuration is as you want it, restart the emulator with CTRL+ALT+DEL. The program will automatically save the commands to the CONFIG.SYS and AUTOEXEC.BAT files.

MAKING MICE MOVE

Most people use the PC emulators on their Archimedes and the second processors on their BBC micros and Masters for running text-based applications, where the screen is controlled from the keyboard and runs reasonably smoothly.



SELECTING A RAM DISC FROM SETUP.EXE

Unfortunately when running graphics applications things are not so simple.

More PC programs now use the graphics modes of the PC, requiring a mouse to get the most out of them. It is hard to achieve mouse control on a Master or BBC micro, but you might think that the A3000/ Archimedes would be better off, coming with a mouse as standard. However that is not the case.

A PC will not acknowledge a mouse's existence without the presence of a mouse driver – a small utility program that comes in a variety of versions, depending on the type of mouse it supports. The most common type is the serial mouse driver supplied by Microsoft for use with its own rodent. Acorn's PC emulator supports the Microsoft mouse driver, but they don't supply one with MS-Dos or DR-Dos. To be fair though, none of the bundled versions of MS-Dos supplied with PC clone machines include a mouse driver either. However drivers are nearly always supplied in the mouse package itself.

So what do you do if you already own a mouse? There are few legitimate solutions.

If you have a PC with a mouse, you can copy the MOUSE.COM or MOUSE.SYS file to your Archimedes, and use it with the PC emulator, as long as you don't use the copy on your PC at the same time. Alternatively you can buy a Microsoft graphics application which normally comes with a mouse driver, or you can buy one of the rare PC programs which control a serial mouse directly. Most importantly, you can put pressure on Acorn to write or license a mouse driver for its emulator – it currently feels that it's a low priority!

THE PC WINDOW

Acorn's multi-tasking PC emulator is scheduled for release later this year. From all accounts it won't be multi-tasking in the *Windows 3* or *DesqView* sense of the word as it will only to run a single PC task from the desktop, but it will be able to do this in a Risc OS window while running other Archimedes applications. You are also likely to be able to cut and paste screen areas between PC and Archimedes windows, presumably as both interpreted text and as bitmapped images.

Acorn says that the emulator will run on an Arm 2 machine, but that it will benefit from the extra processing power of the Arm 3 chip. But what about the memory capacity? I think the new emulator will be happiest on a 4Mb machine – 2Mb are needed to multi-task two or more Archimedes applications and the same is needed to run the current PC emulator with 640K of PC Ram available. Nonetheless, being able to run a PC application alongside Archimedes programs will be a big improvement. At present you have to consider your machine as two separate micros in a single case.

Simon Williams

NEWS IN BRIEF

● **POST-IT NOTES,** those oblong self-stick pads used for writing down phone numbers and leaving reminders, now have an electronic equivalent. Info-Select is a pop-up program that enables you to write, sort and retrieve up to 64,000 notes on a PC. It will pop up over text and graphics screens and incorporates a lot of extra goodies, including a phone dialler and calendar.

The package costs £79, and is available from First Hand Software on 081-780 0201/4.

● **THE WELL-KNOWN** wordprocessor from Tasman Software has been thoroughly revamped with dual document working, a spelling checker and a thorough indexing system which can also be used as an extended GOTO function.

The price has also been changed in line with the improvements and is now £149.95. The original Tasword PC will continue to be sold at £42.51. Further details of both products can be obtained from Tasman on (0532) 438301.

● **FLASH EPROM,** the non-volatile memory which can be erased and reprogrammed in situ, is beginning to catch on. Formerly the preserve of companies such as Psion, which used it in its innovative Mobile Computer series, it is now available to PC users, but only at a price. A flash card reader, which can handle cards containing up to 64Mb of Flash Eprom, is now being distributed in this country, at a recommended price of £445. Internal flash discs, which have an access time of 250ns and a data transfer rate of 2Mb/s, start at £170 per megabyte.

For details of your nearest dealer contact DMST on (0635) 247100.

● **IF YOU ARE** printing several copies of a multi-page document to a laser printer, you will considerably reduce the overall print time if you print all the copies of each page at the same time. This way, the printer only needs to create one image for each page. You'll have to collate the print out manually, though!

● **IF YOU HAVE** any PC news, tips or topics that you would like to see covered in this column write to Simon Williams at BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

NEXT MONTH

BBC ACORN USER

JUGGLING

If you want to improve your manual dexterity, try juggling. Run this Arc/Beeb program to help you keep all those balls in the air

ARCVENTURE

We step back to Roman times with Sherston Software's new educational package

GONE SHOPPING

If you go supermarket shopping, but forget what you want when you get there, this Beeb program should stop you fr.om going off your trolley

GO-FASTER BOARDS

Arm 3 upgrades can make your Arc speed up. But what boards are available and how do they compare? Don't miss our review

Watch out for the September issue of BAU – available August 9 1991

PLUS

ARC APPS

Following on from our successful A3000 First Steps series, we begin a new series on useful applications, starting with *First Word Plus*

IF YOU GO DOWN TO THE WOODS TODAY...

You can read our review of *Red Riding Hood* and *Freddy Teddy Adventure*

PIECES OF EIGHT

We delve deeper into the *BAU* archives for more classic programs for the Beeb

REGULARS

- All the latest news and views from the world of Acorn
- Our ★INFO helpful advice and ideas section covering A3000, Archimedes and Beeb
- Your letters and problems
- Programs galore on the yellow pages and much more

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TO THE NEWSAGENT
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ADDRESS ____________________

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Would you buy a Winchester from Bodgit and Scarper?

No, of course you wouldn't. You would look for a manufacturer with many years of experience in providing hard discs for Acorn machines. A manufacturer with a proven track record for quality, reliability and performance. A manufacturer dedicated to innovation, driving the band wagon rather than jumping on it. In short a manufacturer like Oak Solutions.

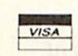
When you buy an Oak Solutions SCSI hard disc, not only do you get the fastest SCSI interface available for the Archimedes but also the peace of mind enjoyed by thousands of other satisfied customers.

All Oak Solutions hard discs are exhaustively tested under computer control. Each hard disc is tested with its own SCSI interface, its own mains lead and even its own formatter disc, and only those systems which behave perfectly on test are shipped to customers. Drives are sent by overnight courier service and are packaged in specially designed cartons for maximum protection. This means that when you receive your Oak Solutions SCSI drive you can be secure in the knowledge that it will work first time – every time.

Rather than receive an empty drive, all Oak Solutions SCSI hard discs come packed with over £200 worth of software. This includes the Euclid 3D Graphics package, the RISC OS Companion Volume 1, Disc Tree hard disc backup, store and search utility, Worra Battle and Remote Logon to allow you to access your hard disc remotely from other machines over Econet.



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Telephone for Education Prices

op Press..Stop Press..Stop Press..Stop Pr

In response to those people who have telephoned our technical support line over the last few weeks complaining about SCSI cards they've bought from other manufacturers, we've decided to make this generous offer. For a limited period only we will accept your existing SCSI card in part exchange for one of our superb 16-bit high speed SCSI interfaces. All you have to pay is £75 plus vat - a saving of £124 from the RRP!

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Internal Drives for 300/400 series		External Drives for 300/400 series and A3000	
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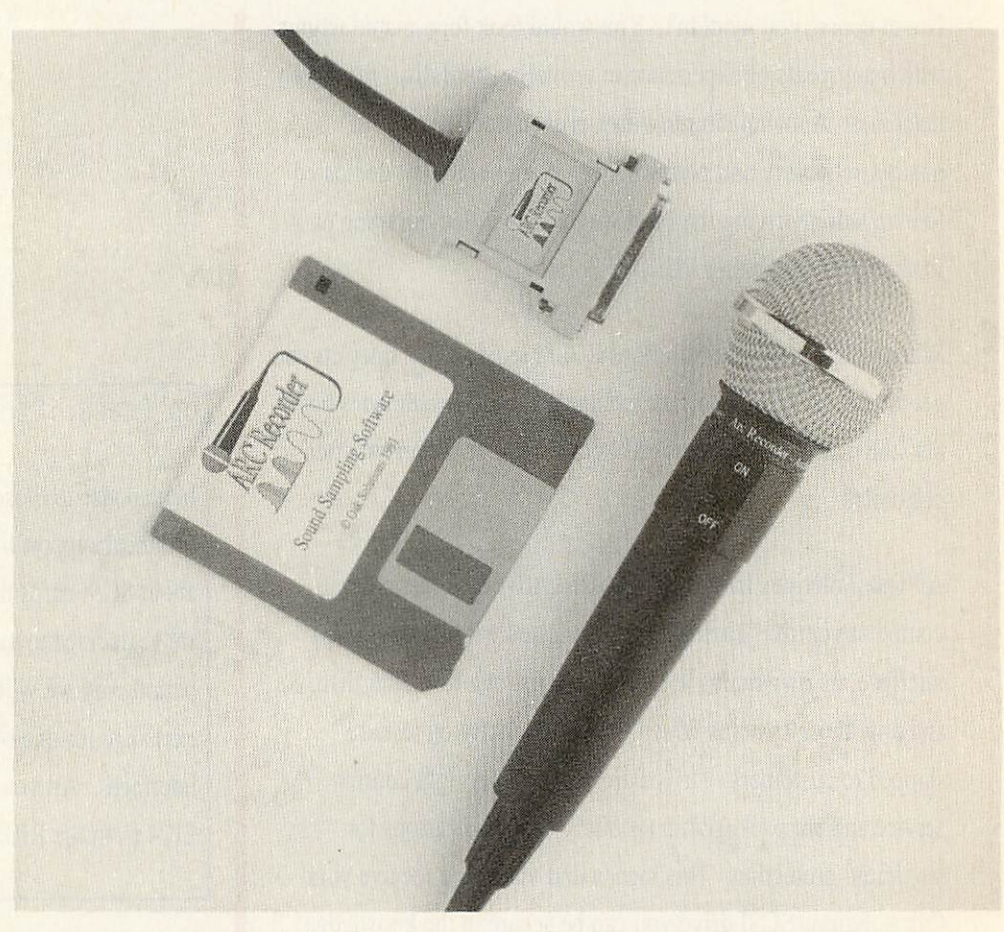
If you want to sample, you'll find this more than ample.

Sound sampling involves converting the signal from a microphone or other analogue source into a digital representation of that signal. This is done by 'sampling' the waveform at regular intervals and storing the instantaneous values of the signal.

Professional systems, such as Compact Discs, store these instantaneous values to 16-bit resolution ie. a range of over 65000 discrete values. Since the sound system of the Archimedes works to 8-bit resolution, most Archimedes sampling systems also work to 8-bits.

These stored values can then be output via a digital to analogue converter which recreates a close representation of the original signal. On the Archimedes, the VIDC chip contains a multi channel D/A converter, and so, this part of the process can be achieved without recourse to additional hardware.

Sound sampling on the Archimedes has typically involved fairly large expenditure on a sampling podule which takes up a valuable podule slot. Oak Solutions' Arc Recorder overcomes both these problems whilst providing 8-bit quality sampling.



Arc Recorder consists of a hand held omni-directional electret condenser microphone, with integral wind shield and on/off switch, which simply plugs into the printer port of any Archimedes or A3000 via a 3 metre length of shielded cable.

Arc Recorder is robustly manufactured to withstand the rigours of the classroom. and could not be easier to use.

The software supplied with Arc Recorder allows samples to be recorded, played back and transferred to Genesis II and other Archimedes applications via the standard Armadeus file format.

Arc Recorder has several modes of operation; recording may begin on a button press, or be set to start when the sound level exceeds a certain threshold.

Sound samples may be edited, and the start and end positions of the sample may be adjusted so that only the required portion of the sound is saved.

A Genesis II support module and application is also supplied for users wishing to integrate real-time sampling within their own Genesis applications. This allows exciting applications such as talking books, interactive modern language self study packages, special effects for school drama productions and sound libraries to be created.



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STAR LETTER, £15

The Archimedes range of computers have been around for four years; yet it is sad that even now, we have very little software compared to just about every other computer available.

At first I was excited by the potential of such a computer, little software, but surely that situation will change – it's just a matter of time.

Since purchasing my computer two years ago, my initial optimism has waned somewhat, and I begin to envy other computer owners. They all have a very large selection of software. Not all of it is spectacular but much of it makes the best use of the hardware.

If I was well off I would buy a PC for business and an Atari for games, but I wanted a reasonably priced computer that could do all this and more, hence my Archimedes.

I know that the Arc and A3000 are powerful computers, and that there is some excellent software available – such as *Impression*, *Atelier* and so on. But I am constantly frustrated when I hear of innovative software that is not being written for the Arc.

The problem seems to lie in the size of the user base – possibly Acorn could reduce the price of the A3000, perhaps it could encourage software houses to produce software that is not available on the Arc (and so would be unchallenged). Perhaps it could try a more aggressive marketing strategy – advertise on national television and so on – take a leaf out of Alan Sugar's book, instead of sitting back and letting third parties produce software if they want to.

Without a large user base many companies not normally associated with the Arc will avoid producing software for it, and without the software then people will avoid the Arc.

S J Elliot
Newport

VIEW DRIVERS NUTS

Like many other retired middle-aged persons, I have sat for frustrating hours in the past months in front of my admittedly ageing set up of Master Compact and Panasonic KXP 1180 printer, totally unable to discover what mental incapability prevents my producing miracles from the machinery. By miracles I mean such things like italics, bold printing, subscripts and so on.

After a lot of fishing among younger computer literates I was told that I was naive in using the printer 'as issued' and that I needed a printer driver. I was surprised that the supplier had not told me this and set about trying to find one, not really knowing what I was looking for.

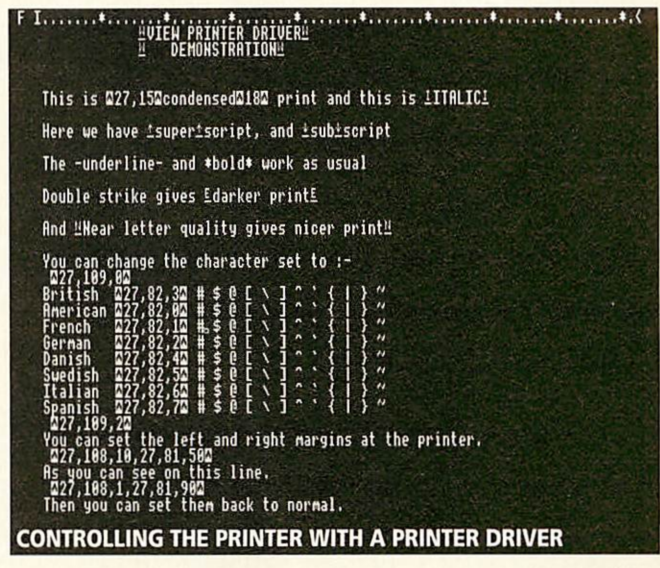
Someone else told me that these things come on the 3.5in disc supplied with my machine, and finally a sympathetic soul told me of your magazine. This was a straw at which I clutched and I bought the May issue.

And miraculously there was your Pieces of Eight article, and the *View* special which mentioned such a printer driver. So how can I get a *View* printer driver generator? Can I buy a disc and manual?

Can you please help me into this magic world? I can just about write letters and print them off without all the frills, I'm sure there is more to computers and wordprocessing than that.

J W W Augar
Royston

For a printer to produce special effects it has to receive codes, from then on it prints in this style, until it is turned off with an off code. What a printer driver does is interpret special highlights in the text into these codes, according to a table. This table is created and edited with a generator such as the one from May. There is an Epson printer driver already in *View* to allow you to print bold text (SHIFT F5) and underlined text (SHIFT F6) but a printer driver that you can tailor to your own purposes is obviously more flexible. You can either type in the generator listing from the yellow pages or purchase a monthly disc, from which you can load the program. See page 27 for more details on back orders.



CONTROLLING THE PRINTER WITH A PRINTER DRIVER

LPRINT OMMISION

Your treatment of the enquiry from A Tate (Q&A, July) concerning LPRINT was rather superficial.

The point about LPRINT is that there is no output to the screen – very useful in some circumstances. In BBC Basic the same effect can be obtained using *FX 3,x. *FX 3,10 turns off screen output and turns on the printer, *FX 3,0 returns things to normal. So,

```
10 *FX 3,10
20 PRINT"Hello"
30 *FX 3,0
```

is the equivalent to LPRINT"Hello".

J M Shepard
Ilkley

HOLY DISCS

I have two problems, both of which stump me. First, continuous paper feed. On my Panasonic printer, and others I have seen, the tractor sprockets for engaging perforated paper are sited after the print head. In the case of my KPX P1801, about 2-3in distant. So when printing I am forced to accept either a large top margin on the first page, or waste a sheet of paper every print run. Am I missing something or is there a way round it? Can I save a few trees here?

Secondly I have been using 5.25in discs, which have two notches. One being the write protect hole, top left, and a similar hole top right. I believe these are intended for double sided discs or perhaps double density drives. Can you clarify what these discs actually are?

Barry Watts
Hendon

Printers come in all shapes and forms. Some have a choice between push and pull tractor feed, like the Citizen Swift and Star NL-10.

When a push tractor is used the first sheet can start at the print head. Some printers do not have this feature, either through bad design or cost cutting, and therefore will not print from the top of the paper on the first page. We suggest you keep the wasted sheets, remove the sprocket holes, and use them as plain paper. If you want to be extra green the strips can also be used for packaging!

The most likely reason for the two write protect notches centres around a fashion for people who had single sided drives to flip the disc over and use the other side, doubling the storage capacity of each disc. Of course you had to cut another notch and some companies even sold tools to do so. However it was, and is, strongly recommended that this is not done. The disc case is lined with a Jay cloth-like material, which develops a nap. If the disc is turned over, the nap is forced the other way causing strain on the motor, and perhaps scratching the disc.



Professional Upgrades for the A3000

RAM

To really make the most of your A3000 you need more than the basic 1Mb of memory.

The Oak Solutions A3000 RAM card offers an increase in memory to 2Mb or a full 4Mb, to greatly enhance the usefulness of the machine. The RAM card has low power consumption and gives off a minimal amount of heat so that reliable operation is ensured.

The card is easy to fit, and, of course, is fully compatible with all A3000 upgrades such as Econet, disc buffers and internal and external podules.

2Mb	*65.00*
2Mb Upgradeable	*85.00*
4Mb	*199.00*

Monitor Stand

The Oak Solutions A3000 monitor stand provides a low cost entry point to our A3000 expansion system, as well as a superb way to make the most of your A3000 desk space.

The stand bridges the A3000 whilst still allowing access to the mains switch, disc drive and reset button. Unlike some other systems, the A3000 can be pushed underneath the stand, out of the way, when not in use. The stand is of strong steel construction, finished in a sturdy powder coat paint coloured to match the A3000.

Monitor Stand	*£21.00*

User–Analogue Port and Disc Buffer

At last, a professional range of User Port upgrades for the A3000. Our internal expansion podules are available in three varieties. The entry level model provides a fully functional BBC user port, supported with fully 'Acorn Legal' software - ideal for interfacing with the Concept Keyboard.

The next model in the range has a BBC analogue port in addition to the user port, and the top model in the range has both these ports as well as a floppy disc buffer interface to allow extra 5¼" and 3½" drives to be added to your system.

Concept Keyboard Port	*£45.00*
User–Analogue Port	*£54.00*
User–Analogue Port + Floppy Disc Buffer	*£65.00*

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Wed — Interface to a Concept Keyboard and a touch screen.

Thu — Incorporate CSV files to build a compact, high speed database.

Fri — Build your own menus using the tool provided and incorporate them into your application.

Sat — Start using the programmable script language to build a full RISC OS application.

Sun — Rest - give your application to someone else and let them enjoy it!

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QUESTIONS AND ANSWERS

Q I have bought my son a copy of the *Image* graphics program produced at Homerton College. It is an outstanding educational art package. He has been using it effectively at school and at home for completing the course work element of GCSE art and design. I have tried to make a back-up of the program for security, but just cannot copy the program whatever I try. Can you suggest a copying program?

Andrew Bulloch
Ayrshire

A The version of *Image* you have has been published by Cambridge University Press and it is heavily protected to preserve the author's copyright.

You should ask the publishers about the possibility of buying a second version for backup purposes. The publishers forbid copying the program even for backup and security purposes.

Q Can you explain to me what the LOOKUP function is used for in Acorn's *Viewsheet* spreadsheet on the BBC Master 128. I don't find the manual very helpful!

S H Capener
Axminister

A The LOOKUP function is generally used to look up a value in a table. It can also be used in the same way as CHOOSE. LOOKUP is ideal for processes like finding prices in price lists, if each item has a unique code number like bar codes on supermarket goods, then a price list can be set up. It should contain the product code numbers in the LOOKUP range and the corresponding prices in the results range. Incidentally, have you seen Graham Bell's book on the use of *Viewsheet*? It's called *A Dabhand Guide to Viewsheet and Viewstore* and costs £12.95. Chapter seven covers special functions and this includes LOOKUP.

Q I'm a long time user of the BBC micro. Unfortunately my Mitsubishi 40/80 switchable drives are playing up. Can you tell me on where I can either get spares or get new drives?

Henri Comyn
Belgium

A Any BBC dealer should be able to help you. I know that Clarke Computer Services, Abacus Business Centre, Manor Road, Ealing, London W13 0AS has a good reputation for disc drive repairs. Many of its engineers were trained by Viglen Computers which sold Mitsubishi disc drives in the UK.

Q I have a BBC A3000, and have managed to obtain an old 5.25 hard disc drive from an IBM PC. I understand that it is compatible with the Hitatchi ST506 hard disc interface chip that is normally used in the Archimedes and BBC A3000 series of micros. Is it possible to link up a 5.25 inch hard drive to a ST506 hard interface produced especially for the BBC A3000?

A D Edgeworth
Churchdown

A Theoretically it should be possible to purchase an ST506 hard disc drive interface separately from a hard disc. I believe Morley did market such a piece of hardware. However, I have been unable to track down anyone who has managed to use one of the older 5.25 inch drives with the ST 506 interface you have purchased, or any of the other popular ST 506s available. Advice I have received is that virtually any hard disc can be used with an Archimedes or an A3000 provided that the drive has the ST 506 interface. The Archimedes and A3000 are able to cope with both fast and 'slower' hard discs, ie, 40ms and 65ms, so your problem with using the 5.25 inch drive with your A3000 is probably not one of speed.

Many people have added disc drives actually produced for the IBM PC or clones to their Archimedes 410 and 420 computers. These micros came with the ST506 disc interface built into the main printed circuit board but with the hard disc as an upgrade path. These people have often used MiniScribe units such as the MS8425F. This is a common upgrade path for PC clone owners wishing to add a hard disc to their machine. It is widely available for under £200, it is however a 3.5 inch drive.

Q I have recently managed to pick up a secondhand mouse for use with my BBC micro. It is an AMX mouse and it came with an art program and mouse support Rom.

I want to start writing some programs that use the mouse. I understand the programming side of things but cannot get the cursor to be moved by the mouse. This appears so simple but it is proving difficult for me to solve.

Brian Henderson
Woodford Green

A I think the problem you have is simple to solve. I suspect that the version of the mouse support Rom necessitates you 'turning the mouse on' by typing the command *MCURSOR ON.

If you have a particular problem with an Acorn micro, commercial software or a program you are trying to write yourself, then BBC Acorn User might be able to help. The BAU Post A Problem service guarantees to give you a personal answer to your problem within 10 working days – and for just £4.
Write out your problem with as much detail as possible and, if a program is involved, include a disc or cassette. Fill in the coupon and send it and your problem along with a cheque or postal order for £4 (including VAT) made out to Redwood Publishing. If you require recorded delivery, please add the cost of this.
Please note that debugging readers' own programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the Post A Problem service will only be able to make general comments.
The Post A Problem service will answer the problem and return all corresponding material received within 10 working days of receipt. If we fail to match this promise then your cheque or postal order will be returned – you just can't lose!

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Name..

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Daytime phone number..
I enclose a cheque/postal order for £4 made out to Redwood Publishing and an SAE with my problem.

Office use only : Date in...........Date Out..........Reference..........

With this done you should be able to move the cursor to correspond with the movements of the mouse.

If things still don't work it could be that the internal workings of your mouse are faulty or just dirty. You could improve this by unscrewing the bottom and blowing clean or carefully removing hairs and dust with a clean paint brush.

Q I'm lucky enough to own two micros at home. One is a BBC A3000 and the other a IBM PC-286 and feel that I could save some money by sharing some items of hardware between the two computers. Is it possible to share printers between two completely different makes and types of computers? If so how do you do it and what do I need to buy?

Tom Kendall
Wandsworth

A **You can share a printer between computer systems. Printer sharer boxes which enable you to switch between computers are available. I suggest you contact Technomatic or Care Electronics who have models available. Also, see page 10 for details of a new product you may be interested in.**

Q I am looking for a database program that offers a good label printing option. I've heard that Computer Concepts' *Interbase* is the most powerful datahandling package around for the BBC model B. Do you agree and is it suitable?

Mr Leslie Keene
Richmond

A **The Interbase firmware package from Computer Concepts is one of the most powerful database packages available for the BBC micro. It is different to most database packages in that it is totally programmable. However, it does have a built in Card Index program and it is also supplied with a Label program.**

Despite being a powerful datahandling package, the printout facilities provided within *Interbase* are limited to say the least. I think you will find the Label program tedious too. Many other BBC database packages will serve you better and enable you to print out the records held in many different sorts of ways. I personally use the Beebug *Masterfile 2* database for all my label printing tasks. It is simple, effective and has plenty of options.

Q Is it possible to use a colour monitor on an Archimedes and on a Tandon PC compatible?

I would like to get a multisync monitor for DTP on my Arc and wonder if it could also be used for high resolution work on my PC compatible?

G Hicks
Tooting

A **Yes, it is possible to buy a colour monitor that is suitable for use with an IBM PC or most compatibles and the Archimedes series of micros. I would recommend that you consider a multisync monitor manufactured by Taxan, Eizo or Samsung. They all cost between £350 and £500. It is important that the monitor is bought from an Acorn dealer as there can be slight technical issues concerning the use of these monitors on Acorn equipment and they will be able to ensure the computer and monitor is matched.**

A cable for connection to the IBM PC is supplied in the box and any Acorn dealer will sell you the necessary cable for connection to the Arc. I am not aware of any Acorn related company that markets a monitor switcher box. But VGA switcher boxes will be available from the larger PC dealers. If not, maybe Care Electronics will make one up for you.

Q I know Arc Basic is fast. But I heard it can be made to run faster by typing in a simple line. What is this line?

Tom Custom
Hinkley

A **If you type in SYS "OS_updateMEMC",64,64 you can increase the speed of Basic 5 programs by up to 20 percent. This works for all programs written in Basic.**

ACORN CUSTOMER HOTLINE

Since the recent release of Acorn's new SCSI card (AKA131), we have received some very positive feedback on its compatibility.

The SCSI User Guide gives guidelines for selecting suitable Common Command Set 4B (CCS4B) disc drives for use with the SCSI expansion card. In addition, the following drives have been found to work satisfactorily with the SCSI expansion card during normal use of SCSIFS:

Conner CP3100 (100Mb)
NEC DP3861 (109Mb)
Acorn Stacking Filestore (E40S)
Acorn Stacking Filestore (E60S)
Fujitsu M22495A (333Mb)
Rodime Ro3259T (250Mb)
Micropolis1578 (382Mb)
Rodime Ro5180S (140Mb)
Conner CP3200F-1 (200Mb)
Rodime Ro3085S (60Mb)
IBM WDS-3160 (160Mb)
IBM WDS-380 (80Mb)
CDC Wren IV

Magneto-optical drives

Sony SMO-C501
Maxstore Tahiti

Acorn will be interested to know of any other drives which customers are successfully using or, indeed, drives they have difficulties with.

If you have any details to send us on this, please write to me at Customer Services, Acorn Computers Ltd, Fulbourn Road, Cherry Hinton, Cambridge CB1 4JN.

● Acorn has released a new version of the PC emulator, version 1.60, which is easier to use and incorporates extra features.

The PC emulator now runs from and returns to the Risc OS desktop, leaving all your current applications and data intact.

You can access Dos files directly from the Risc OS desktop, using the MultiFS application provided. This allows you to copy, delete and drag the Dos files as if they were Risc OS files.

The CD-Rom support provided gives you access to standard PC CD-Roms, which can be displayed in a window on the screen.

The mouse driver enables you to use the mouse supplied with your Risc OS computer as if it were a Microsoft bus mouse.

Emulation of the Intel 8087 maths co-processor increases the speed of floating point operations by a factor of 14.

If your system has 2Mb of memory or more, you can run the emulator in a Risc OS desktop window. This enables you to run a Dos application (such as Lotus 123) in one window while running one or more Risc OS applications (such as Acorn DTP) in other windows simultaneously.

If your system has 2Mb or more, you can make use of the CGA, EGA or MDA display.

Partial support for VGA is provided for software which accesses the video hardware directly (Windows 3 can be run on an Archimedes 540).

There is an upgrade path now in place for the latest emulator. Owners who were supplied with MS-Dos are eligible for the upgrade but owners who were supplied with DR-Dos are not.

This means that if you obtained your PC emulator by purchasing either the standard emulator (product code AKA42) or the emulator supplied with the Archimedes 310M (product code AKB30) you are eligible for the upgrade offer.

However, if you obtained your emulator as part of the Learning Curve (product code AKB19) or as part of the Archimedes Learning Curve (product code AKB46), you are not eligible.

If you fall into the former category of eligibility, you can now upgrade to version 1.60 at the special discounted price of £29 (£34.08 inc VAT).

The upgrade consists of a manual, a release note, two PC emulator discs (one disc for machines with 1Mb of Ram, and one for machines with 2Mb or more), CD-Rom support disc and release note and a license agreement for the CD-Rom extensions.

The upgrade pack does not include an MS-Dos disc, so you must retain the Dos disc from your original emulator for use with the 1.60 upgrade.

To obtain your upgrade, send your original PC emulator application disc and manual, a cheque for £34.08 made payable to Acorn Direct, and your name and address to PC Emulator 1.60, Acorn Direct, 13 Dennington Road, Wellingborough, Northants NN8 2RL.

Peter Dunn

ARCHIMEDES

A3000 PRODUCTS

Monitor stand (A3K1) Probably the best monitor plinth available for the A3000 & the basis of a modular system. £24.95

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20mb hard disc (A3K7) A 20 mb hard disc drive ready to fit in A3K2, including the hard disc card and all cabling. We are not aware of any other hard disc upgrade that is treated as an internal upgrade (consult your Acorn dealer or call PRESfor details). £399.00

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65Host 1770 DFS & DFS Filer (A3K12) A ROM & disc upgrade forA3K6 provides – 1) a desktop DFS filer that allows DFS filesto be dragged to ADFS viewers or straight into applications as Edit or Pipedream. 2) BBC 1770 DFS for use in 65Host. Automatic Icon and loader which can allow BBC DFS discs to have <SHIFT BREAK> operation. "...effectively turns your A3000 into a model B..." Acorn User Sept '90. £19.95

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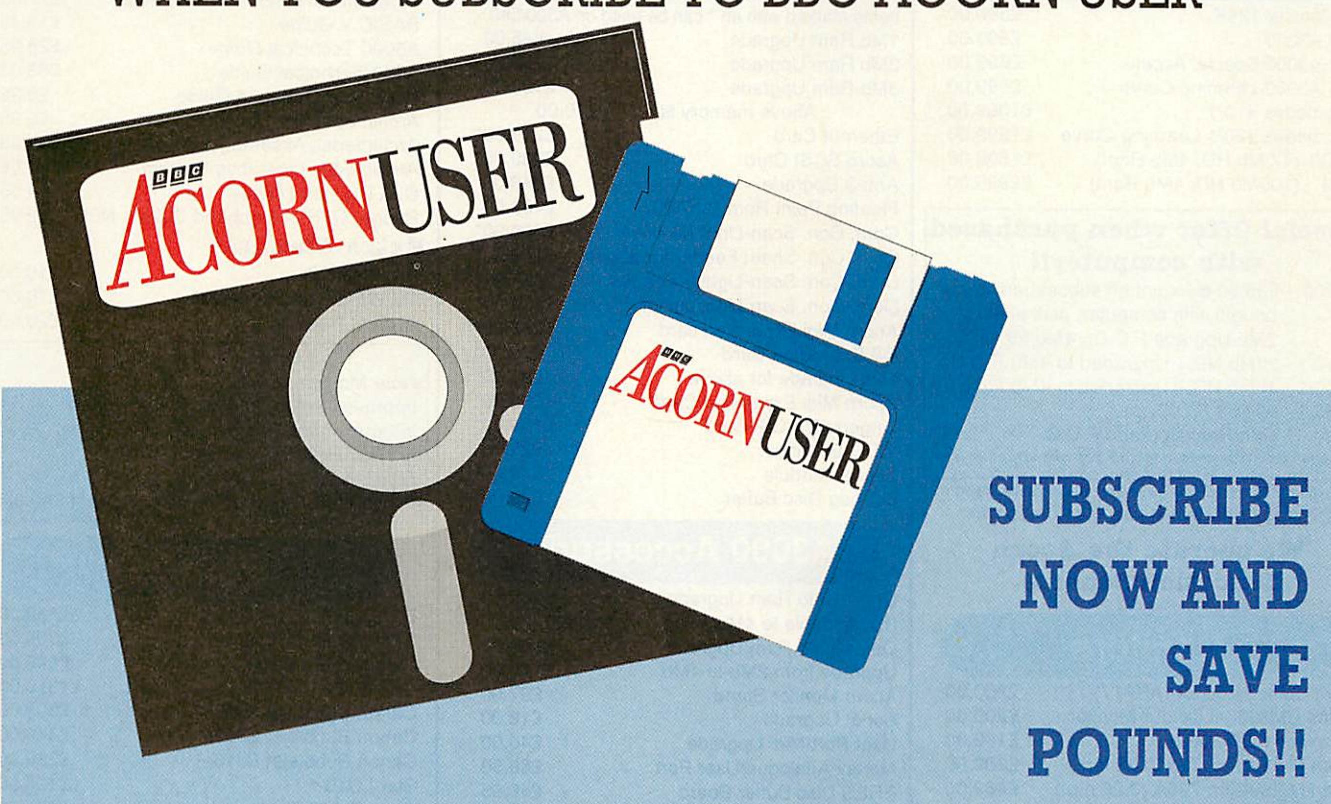




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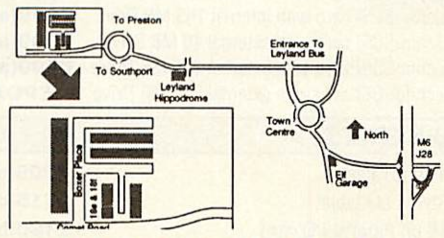
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The MultiPod is a single-width Podule for the Archimedes which incorporates five high-quality devices in one:

- **Video digitiser**
- **Sound sampler**
- **Analogue/joystick port**
- **RS232 serial port**
- **BBC Rom Sockets**

The software provided with MultiPod works in combination with the on-board Podule Manager to make an easy link with the familiar Risc Os Desktop environment. For most users this ought to provide sufficient control over the hardware features, but to accommodate advanced users several *Commands and SWI calls are supported.
There are no Rom sockets in the A3000 version of the board.

MultiPod 300/400 series	£117(b)
MultiPod for A3000	£145(b)
MultiPod RGB Filterset	£15(d)
B&W CCTV camera plus lens	£200(b)

ARCHIMEDES MONITORS

Cub 3000 14" Med Res RGB	£195(a)
Philips CM8833/II Med Res, stereo sound, 12 months O.S.M.	£209(a)
Acorn 14" Med Res, colour with stereo sound	£209(a)
Taxan 770+LR 14" Multisync Hi Res monitor	£379(a)
Taxan 795 Flatscreen Multisync with Atomwide VIDC enhancer	£429(a)

Archimedes EXPANSION OPTIONS

A300 SERIES

RAM & ARM 3	
Extra 1MB	£260(*)
Extra 3 MB	£320(*)
ARM 3-25 MHz fitted by us	£375(*)
Backplane £45(b) FAN	£13(c)
AEDA external floppy drive adapter	£30(c)
External 5.25 40/80 floppy drive	£90(b)
Hard Drives & Controllers	
techno HD Controller for 2 drives	£149(b)
Internal ST506 drives supplied with mounting bracket, cables & instructions.	
20 Mb 40ms	£165(a)
40 Mb 25ms Autoparking	£240(a)
50 Mb 28ms (as A440/1)	£330(a)
External Drives see A3000 upgrades in 3rd column	
External HD Adapter Plate	£30(c)
SCSI Drives & Controller	
as A400 Series in 2nd column	

A400 SERIES

RAM & ARM 3	
1MB Upgrade (410/1)	£49(c)
2MB Upgrade (420/1)	£79(c)
3MB Upgrade (410/1)	£149(c)
ARM 3 – 25 MHz fitted by us	£375(*)
AEDA external floppy drive adapter	£30(c)
External 5.25 40/80 floppy drive	£90(b)
Hard Drives & Controllers	
as A300 Series in 1st column	
SCSI Drives & Controller	
technoSCSI card	£179(b)
technoSCSI card with internal 40 MB Drive	£349(a)
technoSCSI card with internal 105 MB Drive	£699(a)
technoSCSI card with external 40 MB Drive	£399(a)
technoSCSI card with external 105 MB Drive	£799(a)
technoSCSI card with external 313 MB Drive	£POA

A3000 UPGRADES

1Mb £56(c) 3MB	£149(c)
AEDA external floppy drive adapter	£30(c)
External 5.25" 40/80 floppy drive	£90(b)
Hard Drives & Controllers	
Cased techno HD Controller	£175(b)
External ST506 drives are cased with mains PSU.	
20 Mb 40ms Cased, PSU & Cables	£249(a)
40 Mb 25ms Autoparking, cased	£359(a)
50Mb 28ms (as A440/1), cased	£449(a)
For 300/400 please state drive 4 or drive 5	
SCSI Drives & Controller	
Internal 8 bit technoSCSI card & USER PORT	£179(b)
technoSCSI card with external 40 MB Drive	£399(a)
technoSCSI card with external 105 MB Drive	£799(a)
Acorn MIDI/user Port	£49(b)
MultiPod Video Digitiser/Sound Sampler	£145(b)
technoSCAN II Hand held Scanner	£175(a)
Wild Vision Chroma Genlock CG1	£215(b)
Tracker Ball – new low price	£30(c)
technoTablet (needs serial upgrade)	£209(a)
Stylus for tablet	£15(d)
Serial Port Upgrade Kit	£19(c)
A3000 monitor stand	£17(b)
A3000 Technical Manual	£29(c)

A300 & A400 SERIES

Acorn I/O expansion Card	£80(b)
MIDI Add-on to I/O card	£37(c)
MIDI Expansion Card	£66(c)
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MultiPod Filter Set for Video Camera (RGB)	£15(d)
technoSCAN II Hand held Scanner	£149(a)
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Tracker Ball – new low price	£30(c)
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Stylus for tablet	£15(d)
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The package includes the tablet, puck, software and mains power supply, no connections are required to the ARC main board.

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Informative video and parental guide to the National Curriculum

A420/1 LC with Acorn Colour Monitor £1265

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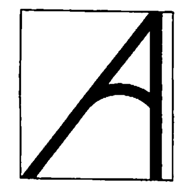
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- Archimedes IEEE Interface Adaptor £269
- Dual RS232 Podule £195
- 16 bit parallel I/O Card £195
- Archi replacement mouse – New design £32
- PC Emulator NEW Faster Version £62
- Software Developers Toolbox £149
- Floating Point Unit £455
- SCSI Adaptor Expansion Card £162
- Keyboard Extension Lead £6
- 2 Podule Backplane £25
- 4 Podule Backplane £38
- Fan for above backplanes £8
- Risc Os Extras Software Disc £5
- Smoked Perspex Low profile Keyboard Cover £8
- Ethernet Card £220

0% Finance Now Available

On Acorn Archimedes A3000 and A420/1 with learning curve packs. (Please telephone for details)

8 Meg RAM Upgrades

- **R810** – A410/1 upgraded to 8MB **£740**
- **R820** – A420/1 upgraded to 8MB **£689**
- **R840** – A440/1 upgraded to 8MB **£579**
- **R814** – R140 upgraded to 8MB **£579**

Turbo Charge Your Archimedes

Increase the speed of your Archimedes by a factor of THREE to SIX times (depending on the software you are running), with Watford's ARM3 Upgrades.

- **ARM-3** 20MHz Upgrade Board **£325**
- **ARM-3** 30MHz Upgrade Board **£375**
- **MEMC** 1A Upgrade **£42**

(ARM 3 price includes a FREE Chip extraction tool)

(Special Offer – If purchased together with an Archimedes Micro, then not only will we fit the card Free of Charge but we will also reduce the price by £40 i.e. You pay only £285 for ARM3 20MHZ & £335 for ARM3-30MHz)

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

- **R302**-A3000 – to 2MB RAM Upgrade **£52**
- **R303**-A3000 – to 2MB RAM Upgrade expandable to 4MB **£169**
- **R304**-A3000 – to 4MB RAM Upgrade **£139**
- **R311**-A305 – to 1MB RAM Upgrade **£50**
- **R312**-A305/310 – to 2MB RAM Upgrade **£235**
- **R314**-A305/310 – to 4MB RAM Upgrade **£425**
- **R412**-A410/1 – to 2MB RAM Upgrade **£39**
- **R413**-A420/1 – to 4MB RAM Upgrade **£75**
- **R414**-A410/1 – to 4MB RAM Upgrade **£105**

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided. The 'simple to follow' fitting instructions supplied makes drive fitting very easy. All disc drives are auto parking. 40Meg & 53Meg drives are fast 24mS type, while 20MHz are 28mS.

P.S. A310 upgrades require a backplane and a fan.

- **3HDP** – Hard Disc Podule only **£135**
- **3HD20** – 20Meg H' Disc + Podule for 310 **£235**
- **3HD40** – 40Meg H' Disc + Podule for 310 **£345**
- **3HD50** – 53Meg H' Disc + Podule for 310 **£474**
- **4HD20** – 20Meg Hard Disc for 410 **£129**
- **4HD40** – 40Meg Hard Disc for 410 **£215**
- **4HD50** – 53Meg Hard Disc for 410 **£335**
- A3000 20Meg Hard Disc + Podule **£299**
- A3000 40Meg Hard Disc + Podule **£429**

IDE HARD Disks: See page 14 of our advert.

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

- **UP10** – to 2MB RAM + 20MB Hard Disc **£165**
- **UP15** – to 2MB RAM + 40MB Hard Disc **£252**
- **UP20** – to 4MB RAM + 20MB Hard Disc **£232**
- **UP30** – to 4MB RAM + 40MB Hard Disc **£318**
- **UP40** – to 4MB RAM + 53MB Hard Disc **£438**

Silicon Vision

Gerber Plot	£95	Super Dump	£22
Solid CAD	£120	Solids Render	£120
Super Plot	£28	Solid Tools	£279
Arc PCB Professional			£275
Realtime Solids Modeller			£136

STAFF VACANCIES

Watford Electronics is the leading supplier in the Acorn computer field and has established itself in the PC compatible market with its Aries PC computers. In its eighteen year history, Watford has always kept itself at the forefront of the new technology. Due to our latest expansion, we require staff to man our BBC/Archimedes and PC Technical Departments. Applicants will be required to be familiar with BBC/Archimedes hardware and software, and PC staff will need to be familiar with PC computer hardware. Good rates of pay, excellent prospects. Subsidised company accommodation is available to single persons if required. Telephone Keith Archer or Shiraz Jessa for interview, or write to us enclosing your CV.

Archi Mouse Port Splitter

Continuous plugging and unplugging of the mouse is not only inconvenient but can also damage your micro. Our handy little Archi mouse port splitter unit eliminates this risk by allowing you to connect a mouse and a joystick or a tracer ball simultaneously to your Archimedes micro. The miniature slide switch on the box enables you to select the socket to be used. **£15**

Graphics, Art, Design & Games

GRAPHICS

Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
HotLink Presenter	£40
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Render Bender	£58
Snippet	£21
Tween	£21

GAMES

ArcPinball	£18
Apocalypse	£15
Arcade 3 Compil.	£12
Arcade Soccer	£15
Arc Pinball	£18
Arc Trivia	£18
Avon	£16
Ballerina	£14
Blowpipe	£16
Boogie Buggy	£19
Break 147	£20
Bug Hunter	£14
Caverns	£14
Chess 3D	£14
Chocks Away	£14
Conqueror	£18
Cops	£14
Corruption	£18
Crisis	£21
Drop Ship	£12
Enthar Seven	£21
E-Type	£13
E-Type Designer	£13
E-Type Extra 100 miles	£13
Family Favourites	£15
Fireball 2	£19
Holed Out Designer	£13
Holed Out Golf	£13
Hostages	£15
Ibix the Viking	£14
Inertia	£13
Inter Dictor 2	£26
Iron Lord	£15
Jet Fighter	£10
Jiglet	£25
Jigsaw	£27
Magpie	£39
Man at Arms	£16
MahJong Patience	£15
Manchester United	£19
Nevryon	£14
Olympics	£15
Pipe Mania	£17
Pirate	£16
Power Band	£18
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£15
Real McCoy	£22
Real McCoy 2	£23
Redshift	£14
Return to Doom	£16
Revelation	£54
Repton 3	£15
Rotor	£19
Splice	£25
Sporting Triangles	£24
Star Trader	£14
Superior Golf	£15
Talisman	£12
The Pawn	£19
Thundermonk	£11
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic	£15
White Magic 2	£15
Wimp Game	£15
Worldscape	£16

Miscellaneous

Ancestry	£59
Arccomm Pack	£24
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Broadcaster Loader	£65
Equasor	£40
FlexiFile	£98
Genesis	£65
Genesis 2	£113
Hearsay Comms Pack	£50
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star	£15
Numerator	£66
Presenter 2	£35
Presenter Story	£145
Revelation	£62
Rhapsody in Blue 2	£45
Speech!	£15
Toolkit (Clares)	£35
Touchtype	£40
Tracer	£46

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77	£77 each
Assembler; LISP; Prolog X	£149 each

ANSI C Rel. 3	£125	BASIC Compiler	£77
Cambridge Pascal	£60	Logotron Logo	£55
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110

Minerva's Archimedes Software

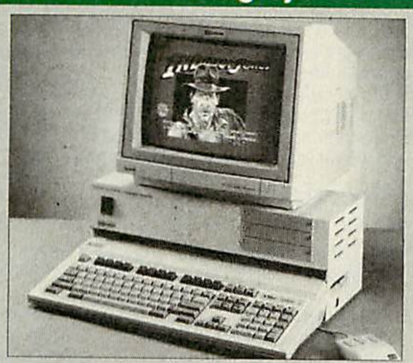
Home Accounts*	£36	Sales Ledger*	£53
Stock Manager*	£53	Purchase Ledger*	£53
Nominal Ledger*	£53		
Ancestry	£59	Reporter	£29
System Delta+	£55	Mailshot*	£29

System Delta + Reference Manual	£25
Order Processing/Invoicing*	£53
School Administrator	£118

** Requires System Delta*

NEW Business Accounts Packages
Nominal Ledger, Order Processing/Invoicing, Purchase Ledger, Sales Ledger & Stock Control
Price: **£78** per Module or
£299 for the complete Software Suite

ULTIMUM – Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

The accepted standard for Archimedes computer expansion is the Acorn Podule, designed initially to fit the old 310, and also for the later A400 and A400/1 series micros. The podules fit inside these computers up to four at a time. The A3000 is the little brother of the family, but can only have one podule at a time, plugging into the back of the computer.

Other attempts have been made to expand the A3000 by trying to introduce a 'mini-podule'. This is impractical for many reasons, amongst which is the reluctance of manufacturers to produce them. Nobody wants to re-design podules already produced. Some cannot be produced on a 'mini-podule' as they are far too complicated and simply wouldn't fit.

Watford Electronics listens to the demands and requirements of its customers, and we are glad to say that we have come up with the only real solution to the A3000 expansion problem. The ULTIMUM Podule Racking System allows up to three FULL SIZE standard Archimedes 300/400 series podules to be fitted to the computer. In addition, there is also provision for a hard disc drive and a podule to be fitted internally.

Since the ULTIMUM Podule Racking System takes proper full size podules, you will be able to use any of the currently available peripheral equipment, from companies like Computer Concepts, Armadillo, Acorn and of course, our own brand.

Fitting the podules to 'ULTIMUM' is simple. They are neatly fitted inside the metal case of the rack, avoiding the previously untidy method of hanging the podule off the back of the computer, risking damage to both, it and to the computer.

'ULTIMUM' has its own power supply, so no strain is put on the A3000 power supply. There is also an IEC mains output socket for an Acorn type monitor so reducing the number of plugs required to go to the mains. The ULTIMUM is rigidly clamped over the top and under the computer, and allows direct access to the floppy disc drive and reset button, rather than obstructing access as on other systems. The mounting method employed is so firm that the computer could even be safely transported without the assembly falling apart.

Price: £125

Archimedes A300/A400 SCSI Hard Disc Offer
(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £1030
Offer Price: £475

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.
New RISC OS Version **Only £15**

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.
• A300/A3000 £21 • A400 £25

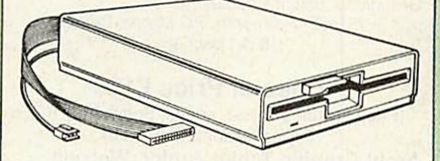
Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399** *(carr £7)*

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during July

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	£115
Econet Module for the Master	£45
Twin ROM Cartridge for Master	£9
Quad ROM Cartridge for Master	£14
Master Reference Manual I	(No VAT) £14
Master Reference Manual II	(No VAT) £14
Master Advance Ref Manual	(No VAT) £17
64K Upgrade Kit for B+	£32
Acorn 1772 DFS Kit complete	£49
ECONET Upgrade Kit for BBC B	£42
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	£238
Morley Teletext Adaptor with ATS Rom	£99
Ecolink	£270

NEW LAUNCH for Archimedes

See Page 14 of our advert

Desk Top Publisher

Acorn's Archi DTP Package	£108
Impression 2 DTP Pack	£135
Impression Junior	£76
Tempest DTP Package	£95

Archi Wordprocessors

Pendown Archi	£48	Archie Spell Master	£25
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£19
1st Word Plus – 2	£63	EasyWord	£30

Databases

AlphaBase	£36	Multistore	£195
Knowledge Organiser	£42		

Spreadsheets

Intersheet Disc	£24	Viewsheet	£45
Sigmasheet	£39	Schema	£89

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Logistix £79 • Pipedream 3 £119
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £85



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Education Software

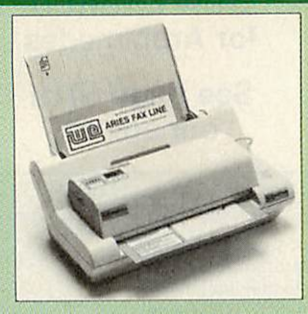
- Advanced Folio: 7-14 years. Has the simplicity of a basic wordprocessor with the presentation quality of a Desk Top Publisher £38
- Colourcopter & Numbercopter: 4-7 years. Flying start in pre-reading and pre-number skills
- Colourcopter includes 7 programs to develop matching, sorting, coordination, letter & word recognition £28
- Numbercopter: Includes 8 programs to develop memory, sequencing, logic, number, more and gone away, word order and rhythm skills £28
- Best Four languages 5-11 years: Four best selling programs which encourage children to work together to improve their linguistic ability £33
- Hands on Spelling 5-11 years: Promotes a visual approach to mastering spelling, linking the skill with other National Curriculum areas as hand writing, talking and reading. £30
- Asian Folio – Gujarati 80T £45
- Best Four Languages £35
- Best Four Maths £35
- Frieze 7-16 years £37
- Kaleidoscope 7-16 years £37
- Merlins Castle £22
- Maths 9-13 years £25
- Number in the National Curriculum £55
- Screenprint pack of 5 5-16 years £150
- Time Traveller 7-16 years £40
- The Lost Frog £22
- World Map Study 7-16 years £35

(More Educational software on page 10)

Call or write in for our NEW 100 page Summer Catalogue

Continued→ → → → → → → → →

Archi A4 Scanner



This new A4 image scanner from Watford Electronics is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.

The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.

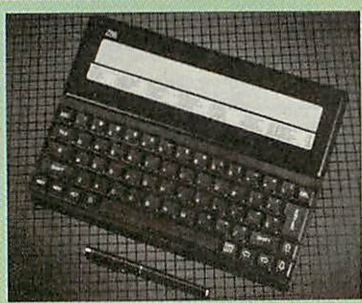
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

Introductory Prices:

Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

Z88 Portable Micro



£185

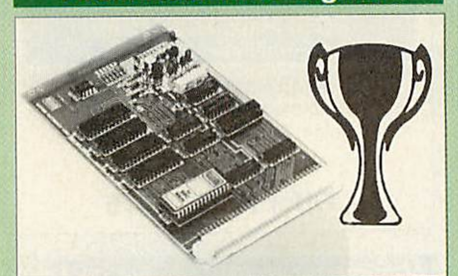
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

- 32K RAM Pack or 32K EPROM Pack £18.00
- 128K RAM Pack or 128K EPROM Pack £42
- 512K RAM Pack £175
- Z88 Eprom Eraser Unit £33
- Z88 Spellmaster for Pipedream £51
- Z88 Carrying Case £8
- Z88 Computing Book £9.95
- AA Nicad Rechargeable Battery £1.50
- Battery Charger Compact & Fast £6
- Z88 Serial Printer Cable £8
- Z88 Parallel Printer Cable £25
- Z88 to Archi Link £15
- Z88 to BBC Link £20
- Z88 to PC Link II £30
- Z88 to Macintosh £52
- Z88 Mains Adaptor £9
- Z BASE £56
- Z TAPE £42
- Z TERM £42
- Z88 Modem £149

Archi Real-Time Digitiser



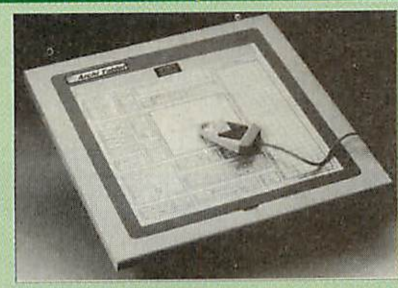
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £175

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

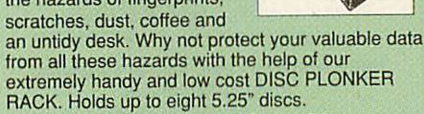
Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.



Protection at Only: **£2**

Acorn & Watford DFSs

- Watford sophisticated DFS ROM £16.00
- Watford DFS Kit complete £69.00
- We will exchange your existing ROM for Watford's ultimate DFS ROM at only £12.00
- DFS Manual (comprehensive) £6.95
- Acorn DNFS ROM £17.00
- Acorn ADFS ROM only £25.00
- Acorn 1772 DFS ROM Kit £49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

- SPECIAL PRICE **£44.00**
- DDFS Manual (No VAT) **£6.95**
- We will exchange your existing DFS Kit for our sophisticated DDFS for only **£30.00**

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

- *10 x 5.25" S/S D/D 40T (744)* £5
- *10 x 5.25" D/S D/D 40T (745)* £5
- *10 x 5.25" S/S D/D 80 Track (746)* £7
- *10 x 5.25" D/S D/D 80 Track (747)* £7
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* £9
- *10 x 3.5" S/S D/D 40/80 Track* £7
- *10 x 3.5" D/S D/D 40/80 Track* £7
- *10 x 3.5" Double Sided High Density* £13

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

- *10 x **M3** 3.5" D/S D/D 80 Track* £7
- *10 x **M9** 3.5" D/S High Density* £12
- *10 x **M4** 5.25" S/S D/D 40 Track* £5
- *10 x **M5** 5.25" D/S D/D 40 Track* £5
- *10 x **M7** 5.25" D/S D/D 80 Track* £7
- *10 x **M8** 5.25" D/S H/D Hi-Density* £9
- ***M2** 3" Double Sided* £2.50 each

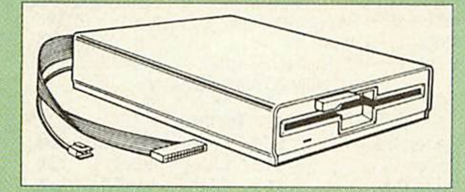


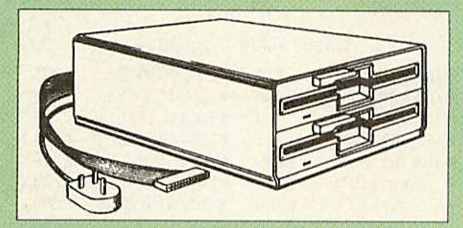
CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public. If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, are the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal. Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. ***Ideal for Schools & Colleges.*** *When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths). P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.*

"Test Bureau Approved for Use in Education"



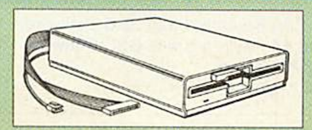


Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	£72
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	£142
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	£82
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	£155

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer



- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
- A comprehensive DFS Operating manual

Bargain at Only **£119** (Offer valid until stocks last)

3.5" DISC DRIVE

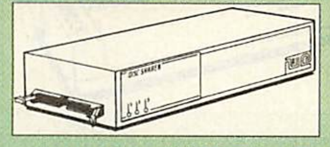


These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	£62
• **CLD400S:**	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	£83
• **CD35:**	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drive Sharer

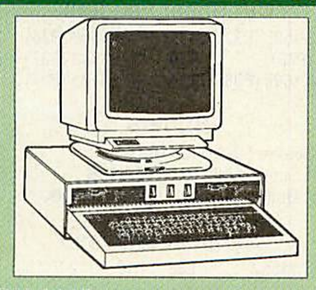


(Ideal for educational establishments)

A low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables **£55**

Disc Drives in Monitor Stand



• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

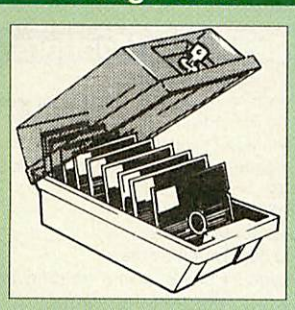
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units

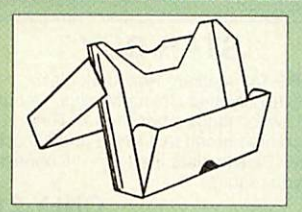


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** – holds up to 50 5.25" discs **£4.95**
- **M85** – holds up to 95 5.25" discs **£6.95**
- **M25*** – holds up to 25 3.5" discs **£4.95**
- **M50** – holds 50 3.5" discs **£6.50**
- **M10** – holds 8 of No. 10 Data Cartridges **£15**

* Not lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs. **£1.50**
Holds up to 10 x 5.25" Discs. **£2.00**

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

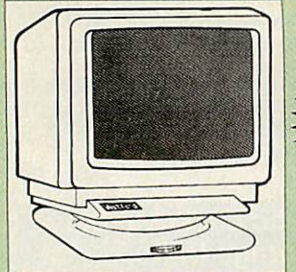
(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)



BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D		£29 for 50	£52 for 100

Continued→ → → → → → → → →





Microvitec Monitors

- **1431** – Standard Resolution Monitor £169
- **1451** – Medium resolution, suitable for word processing in mode 0 £209
- **Cub3000** Medium Res for A3000 £189
- **1441** – High res, exceeds the capabilities of the BBC Micro £359
- **2040 CS** 20" Hi Res £675
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 5D	£1299
• Eizo 9070S	£579	• Taxan 770LR	£379
• NEC 2A	£255	• Taxan 775	£375
• NEC 3D	£345	• Taxan 795-PC	£425
• NEC 4D	£679	• Taxan 875	£725
• VIDC Enhancer Board			£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

Philips

- **BM7502** 12" Hi-res Green Monitor £70
- **BM7522** 12" Hi-res Amber Monitor £67
- **CM8833** 14" Med. Res Colour Monitor £178
- TV Tuner for CM8833 Monitors £62

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor . A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £176

Dust Cover for Philips Monitors £6
(Securicor carriage on Monitors £7)

Spare Monitor Leads

BNC Lead for Zenith or Philips £3
Skart Monitor Lead £5
RGB lead for TAXAN Monitors £3
Archimedes Colour Monitor Lead £7.50

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10E	£205	£54		£18
BJ300	£354	£88	£65	£12
BJ330	£399	£110	£79	£12

- Spare Battery pack for BJ10E £33

NEC Pinwriter Printers

• P20	£186	• P70	£475
• P30	£250	• P90	£655
• P60	£374		

Be Satisfied Before You Buy

We have on display, various Micros, Printers, Disc Drives, Monitors, etc. Call in at our showroom to evaluate before you buy.

Concept Keyboards

Standard A3 Keyboard with BBC Software £143
Standard A4 Keyboard with BBC Software £117
Archi A3 Keyboard £144
Archi A4 Keyboard £118

FREE On-Site Maintenance

This month we are also offering at no extra cost to all our customers, 12 months, On-Site Maintenance on all Multiscan colour monitors, all Panasonic printers, and all Laser Printers, Roland Plotters and of course the full range of Archimedes micros. Should the machine fail, simply telephone the maintenance engineer, who will call in within 12 working hours.
(Offer applicable only when bought at prices advertised in this advert. UK mainland only).

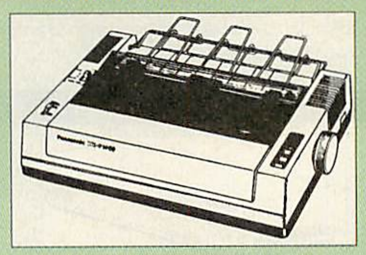
Hewlett-Packard Printers

• # Desk Jet 500	£299	• Paintjet XL	£1092
• Desk Writer (Mac)	£482	• Quiet Jet Plus	£359
• Desk Jet Cartridge	£15	• HP Think Jet	£239
• Paint Jet Colour	£589	• Rugged Writer	£839

Now 3 years extended Parts & Labour warranty

- Paintjet Cartridges Black £19; Colour £25
- Desk Jet 500 256K RAM cartridge £129
- HP Epson FX Emulation Cartridge for Desk Jet £59
  HP Apple Talk Interfaces for
- Scan Jet £299 • Paint Jet £POA
- Desk Jet Unlimited (Book No VAT) £19.75

Panasonic Printers



FREE with every **KX-P1081 & KX-P1180** Printers: A printer lead (please specify type required) and a Dump Out 3 ROM for the BBC Micro or 1,000 sheets of paper for other micros (please specify)

- **KX-P1081** 9pin 80col. 144/28 cps £122
- **KX-P1180** 9pin 80col. 192/38 cps £129
- **KX-P1123** 24pin 80col. 192/63 CPS £158
- **KX-P1124i** 24pin 80col. 192/63 CPS £215
- **KX-P1624** 24pin 132col. 192/63 CPS £299
- **KX-P1695** 9pin 132col. 330/86 CPS £299
- **KX-P1654** 24pin 132col. £429

Above prices include FREE, Watford's 12 months on-site maintenance

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£175
KX-1124 (P36)	£79	KX-P1180 (P37)	£70
KX-P1624/1695 (P38)	£124	KX-P1123 (P37)	£70

Buffers

P12 4K buffer Board for 1081 £55
P42 32K buffer Chip for 1592/1595 £16
P43 32K Buffer Chip for 1540/1124/1180 £16

Serial Interfaces

P17 P1081/1592 £32 **P19** P1124/1180 £49

Citizen Printers

120D Plus	£96	124D Printer	£138
Prodot 9	£205	Prodot 24	£225
Prodot 9X	£245	Swift 24#	£205
Swift 9	£138	Swift 24X	£279

- Prodot Cut Sheet Feeder £120
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black £4 Colour £13

Special Offer this month – A FREE Colour option cartridge with every Swift 24 printer purchased from us.

Star Printers

- **LC10** 9pin 80col. 144/36 CPS £112
- **LC15** 9pin 136col. 180/45 CPS £180
- **LC24-10** 24pin 80col. 180/60 CPS £150
- **LC24-15** 24pin 136col. 200/67 CPS £295
- ***FR10** 9pin 300/76 CPS 31K 16 fonts £229
- **FR15** Wide carriage version of above £290
- ***XB24-10** 24pin 80col. 240/80 CPS £299
- **XB24-15** 24pin 80col. 240/80 CPS £365
- **XB-24** Colour Kit £29
- **LC-200** Colour 9pin 80col. 180/45 CPS £158
- **LC-24-200** 24pin 80col. 222/67 CPS £189
- **LC24-200** Colour 24pin 80col. 222/67 CPS £222

*FREE Colour Ribbon with these printers

Star Accessories

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

SPC-10 LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200 £49
8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour £29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Ribbons

LC10; LC10-II; LC15	Black £4;	Colour £6
LC-200; LC24-200	Black £5;	Colour £12
XB24-10; XB24-15	Black £5;	Colour £12

Laser Printers

• Canon LBP-4	4ppm	£655
• Canon LBP-8 IIIR	8ppm	£1505
• Canon LBP-8 IIIT	8ppm	£1389
• Epson EPL7100	6ppm	£689
• HP Laserjet III	8ppm	£1025
• HP Laserjet IIID	8ppm	£1539
• HP Laserjet IIIP	8ppm	£689
• HP Laserjet IIIsi	16ppm	£2499
• Panasonic KX-P4420	8ppm*	£648
• Panasonic KX-P4450i*	11ppm*	£1025
• Panasonic KX-4455 Postscript	11ppm*	£1699
• Qume Crystal Print Publisher 2		£1899
• Star LP-8 III		£979
• Star LP-8 Star(post)script		£1195
• Star LP-4 4ppm		£705
• Star LP-4PS Postscript 4ppm		£875

* Now 2 years warranty

Laser Toners

Canon 2 & 4	£54	Laserjet IIP & IIIP	£55
Epson GQ	£18	Laserjet II/D, III/D	£70
Star LP-8	£69	Qume Crystal	£56
KX-P4420/50	£22		

Laser RAM Upgrades

• IIP & III 1MB	£74	• EPL7000 2M	£365
• IIP & III 2MB	£109	• GQ5000 512K	£95
• II & IID 1MB	£76	• KX4420/50 1M	£115
• II & IID 2MB	£112	• KX4420/50 2M	£159
• II & IID 4MB	£299	• KX4420/50 4M	£349
• Canon LBP4 1M	£175	• Star LP8 1M	£143
• Canon LBP8 2M	£150	• Star LP8 2M	£285

Laser Drum & Developer

• Epson Drum	GQ5000 £93	EPL7100	£129
• Panasonic 4420 Drum	£60	Developer	£59
• Panasonic 4450 Drum	£93	Developer	£80
• Qume Drum	£76	Developer	£56

Jetpage Postscript Cartridge

- HP IIP/III £255 IID & IIID £265

NEW – HP Laserjet

Various Font Cartridges £45
Superset Font £195

Integrex Colour Jet

- Colour Jet 132 Printer £515
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £19.50
- Black Cartridge £11.25
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

INCREDIBLE INKJET PRINTER OFFER

Laser print quality at dot-matrix prices

HP Deskjet 500 Printer	£299
Canon BJ10E Printer	£199

(Offer valid for the month of July only)

Epson Printers

DFX5000	£1089	LQ860 Colour	£465
DFX8000	£1999	LQ1050+	£475
EX1000	£456	LQ1060	£599
FX850	£283	LQ2550+	£709
FX1050	£358	LX400	£109
FX1060	£599	LX850	£150
LQ400	£166	SQ850	£439
LQ550	£209	SQ2550	£645
LQ850+	£385		

Cut Sheet Feeders for

LX400/800/850/LQ400/500/550	£69
EX800/FX800/850/LQ800/850	£130
FX/LQ 1000/1050/SQ850	£159
LQ 2550 £390 SQ2550	£390

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

- EX800/1000 Colour Option £45
- EX800/1000 Colour Ribbon £14
- LQ2500 Colour Option £65
- Multifont Card for LQ550/850/1050 £95

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£95	RS232 + 8K Buffer	£75

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 6'	£6
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£6
IBM/Archimedes Parallel Lead 5 metres	£13
IBM/Archimedes Parallel Lead 10 metres	£19
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.
IBM Keyboard extension lead coiled	£5

Plotters

• HP7440	£425	• HP7475	£599
Roland Plotters			
• DXY1100	£515	• DXY1200	£645
• DXY1300	£845	• DXY2500	£2375
• DPX3500	£3289	• Sketchmate	£333
• Roland plotter Pens, Fibre tip			£7.50

Watch this space for another NEW LAUNCH for Archimedes micro products



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	£7
• 2,000 Sheets 9.5" x 11" Fanfold Paper	£11
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£21
• 1,000 Sheets 15" x 11" Fanfold Paper	£9
• 2,000 Sheets 15" x 11" Fanfold Paper	£16
• 1,000 Sheets true A4 Fanfold Paper 70gms	£11
• 2,000 Sheets true A4 Fanfold Paper 70gms	£21
• Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Special Offer

Hitachi/Acorn 12" High Resolution, ergonomically designed Colour Monitors. Supplied complete with a swivel base and a BBC lead.

Only: £145 (While stocks last)

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£6.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£2.75	£4.50
DMP2000	£2.75	£4.75
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£4.00	–
LX80/86/800/850	£2.75	£4.50
LX400	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£3.25	£4.75
Panasonic KX-P1124	£7.50	£5.00
SQ2500	£23.00	£5.50
Star LC10/NL10	£2.75	£5.00
Star LC24-10	£2.95	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

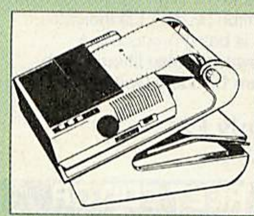
Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595	£7		
P115 for KX-P1180	£7	P145 for KX-P1124	£7
P140 for KX-P1540	£8	P155 for KX-P1624	£10

Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9.95 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics
2 to 1	£16	£17
3 to 1	£22	£24
5 to 1	£32	£36

(Cables extra at £6 each. Please specify type required when ordering)

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.
Centronics **£18;** Serial **£17**
(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£40	£45
4 to 1	£62	£59
8 to 1	–	£89

256k Multi Spooler

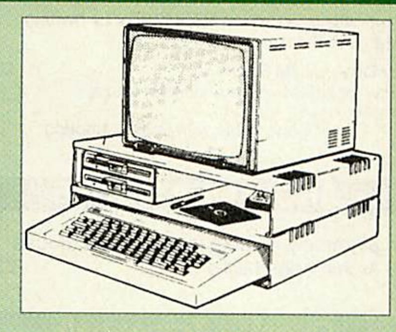
These Auto Centronics Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£135**
- 4 In/2 out **£169**
- 8 In/1 out **£199**

Compact Converter Units

Serial to Parallel **£36** Parallel to Serial **£37**

Plinths for the BBC B & Master 128K Micros

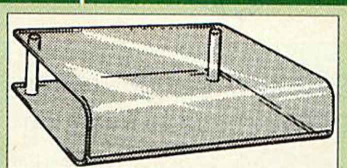


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	**£13**
Double BBC Plinth	420 x 310 x 210mm	**£24**
Single Master Plinth	490 x 310 x 105mm	**£14**
Double Master Plinth	490 x 310 x 210mm	**£26**

(Carr. Single plinth £2; double plinth £3)

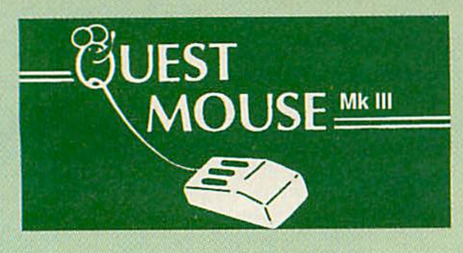
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Continued→ → → → → → → → → →



- Quest Mouse III & Quest Paint £59
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse III only £30
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software



Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

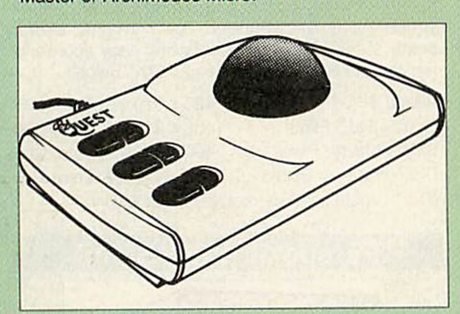
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version **£27**
QT-20 Archimedes Version **£30**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£46

THE NEW Mk III AMX MOUSE

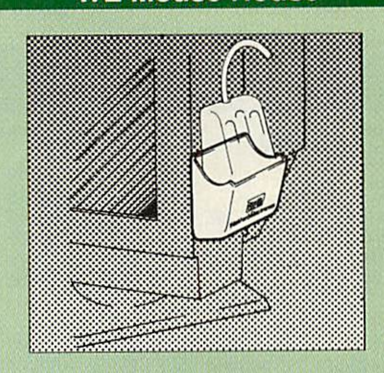
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

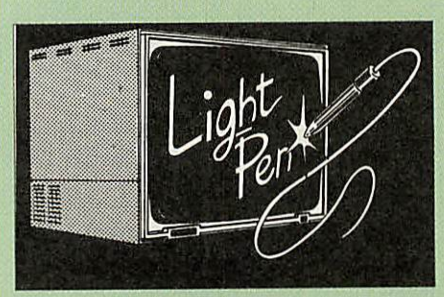
MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.
It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £4



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

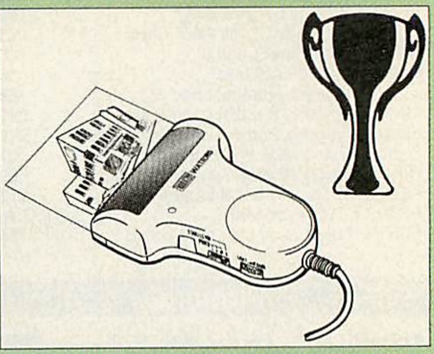
£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£135**



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£69**
Wapping Editor plus Mouse	**£89**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)



At the request of many of our customers we are now able to offer training in the use of Wapping Editor DTP package. For further information please telephone 0923 37774 and ask for Tim or Shiraz

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

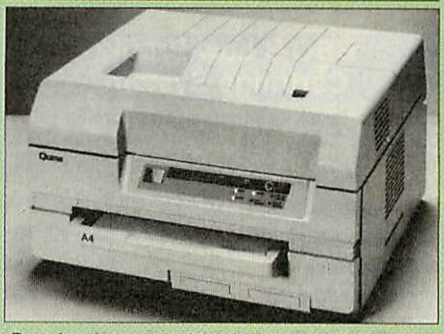
£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Laser Direct



By using the power of the Archimedes RISC processor, it offers the best of both worlds – print speed up to 5 times faster than typical Laserjet compatibles – uses outline fonts so that any font can be scaled to any size – works with all programs that use RISC OS printer drivers. Ideal for use with Genesis, !Draw, Acorn DTP, Impression, etc. Includes 50 sheet paper tray and a single sheet/envelope tray. Requires one expansion slot and at least a 2Mbyte Archimedes. A very compact printer, a very low initial cost and very low running costs.

Special Price: £849

- Special High Res Laser Direct Card 600 DPI for Canon LPB4 Laser Printer **£325**
- LPB4 Printer plus High Res Card **£1025**

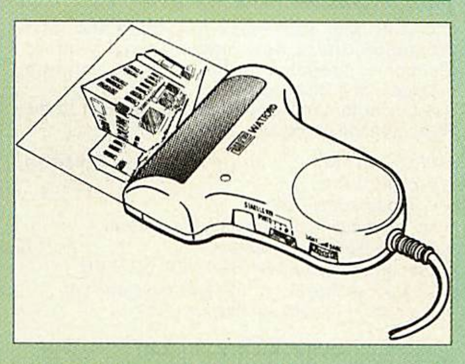
(For demonstration, call in at our retail shop)



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

All prices are exclusive of VAT

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£149**
AHS-3 Archi A3000 Version	**£175**

Continued→ → → → → → → → →

16K Disc Ram Module

(16K Sideways RAM Module)

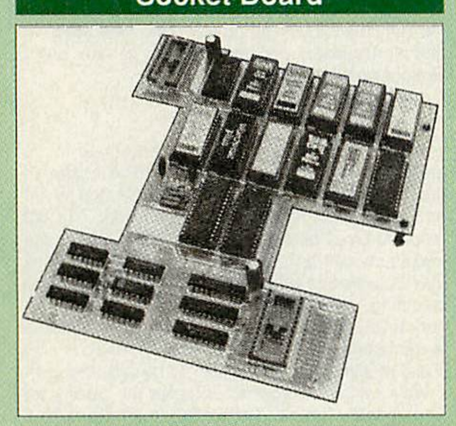
Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for professional software development.
- Supplied with utilities software disc.

Only: **£29** (carr £2)

Optional Battery back-up fitted £3

Solderless Sideways ROM Socket Board



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

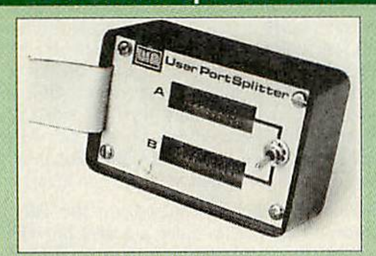
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8.50**
(carriage £3)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

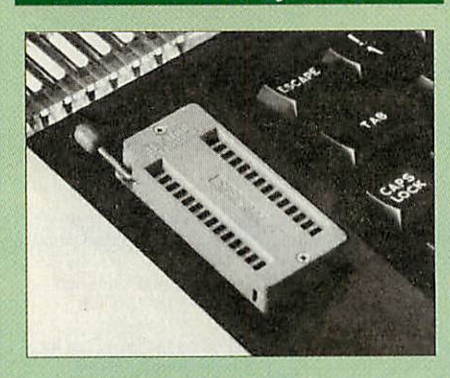
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18** (carr £3)

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

• Complete System	£11
• Spare Cartridges	£2.75
• Spare Rack	£1.65

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£9**; Quad **£14**

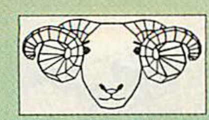
Commander Joystick

Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Launch Price: £15



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£69** (carr. £3)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	£36
	Aries B-12C	£5

Aries B-488 IEEE-488 Interface Unit

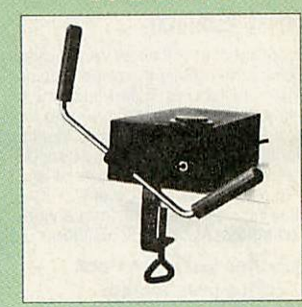
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

Voltmace Joysticks

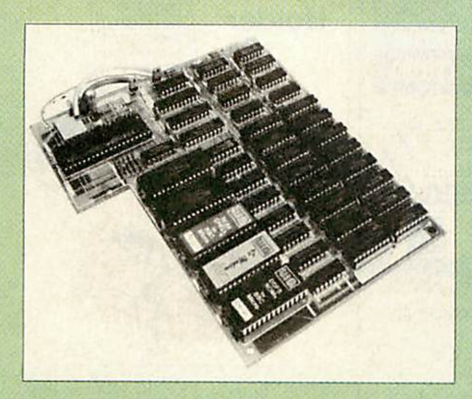
Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 £25

ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

- ROM/RAM card with 32k dynamic RAM £48
- ROM/RAM card with 64k dynamic RAM £65
- ROM/RAM card with a massive 128k dynamic RAM £109

(carriage on ROM-RAM Card £3)

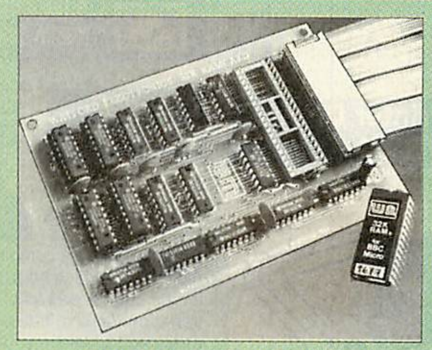
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £9
- 16k Dynamic RAM for Upgrade £13
- Battery backup £3
- Read and Write protect switches £2 each

Complete ROM-RAM board
All options installed £115

P.S.
IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £3)

(Price includes a comprehensive manual and the ROM)

BBC SOFTWARE'S Popular Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs. £20.00
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- ECOLOGY O-Level program. £20.00
- POLYMERS O-Level program. £20.00
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified according to your own rule. £20.00
- ADVANCED TELETEXT SYSTEM £8.65
- PERIOD TABLE SOFTWARE £20.00
- Computers at Work – Primary £17.35
- Introducing Geography 11-17 years £17.50
- Electric Fields 6-14 years £11.25
- Espana Viva – 3 Discs £19.95
- WHITE KNIGHT Chess game £16.00
- A Vous La France £29.00

More Educational Software

- **FUN SCHOOL 2 – Red:** Under 6 yrs – 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a Letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic. £12.00
- **FUN SCHOOL 2 – Green:** 6-8 yrs – Eight programs on Disc, Number Train, Shopping, Maths Maze, Treasure Hunt, Bounce, Packing Caterpillar, 3 Number jump £12.25
- **FUN SCHOOL 2 – Blue:** Over 8 yrs – Eight programs on Disc, Build a Bridge, Passage of Guardians, Unicorn, Logic Doors, Souvenirs, Code Boxes, Mystery Machine & Escape. £12.50
- **FUN SCHOOL 3 – Red** £19.95
- **FUN SCHOOL 3 – Green** £19.95
- **FUN SCHOOL 3 – Blue** £19.95
- Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+ £26
- More French Games – Another 6 games 12 years+ £26
- Au Restaurant and Accident de Route 12 years+ £26
- Boulogne and Oh-Les – 2 programs for beginners £26
- Letters to French Penpals – 11 years+ £26
- French Programs with Henri Beret – The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16 £22
- Six German Games – Aimed at pupils in their first year, but useful as revision for more advanced student of German. 12 years+ £22
- More German Games – Aimed at pupils in their 2nd year of learning German. 12 years+ £22
- The Cloze Program – Using context clues to predict is much more than a gap filling exercise. All ages £26
- An Introduction to Electronics – Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years £26
- Computer Control – This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- The Nuclear Reactor – An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years £22
- PUNCMAN Learning punctuation
  - Puncman 1 & 2 for 7 – 13 years £15
  - Puncman 3 & 4 for 8 – 14 years £15
  - Puncman 5 & 6 for 8 – 15 years £15
- Yes Chancellor – A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures – Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures – Early number learning is a great fun (4-6 years) £15
- Note Invaders – Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years) £18
- Help Your Child learn Basic Map work No. 2 (9-14 years) £18
- Pirate – Educational Adventure (8-14 years) £15
- Spelling Week by Week (6-14 years) £18

Archimedes Software

- Bookbinder £43
- BUMPER DISC £14
- Bumper Disc 2 £14
- Craftshop 1 £26
- Craftshop 2 £26
- Desktop Stories £27
- DigiSim £35
- Droom £17
- Jiglet £27
- Jigsaw £28
- Numerator £60
- Snippet £26
- Fun School 2A Red (up to 6 years) £12
- Fun School 2A Green (6-8 years) £14
- Fun School 2A Blue (8 years +) £14
- Gate Array Teaching System £68

Continued→ → → → → → → → → →

Computer Concept's ROMS

Communicator	£49
Disc Doctor	£28
Inter BASE	£49
Inter CHART	£25
Inter SHEET	£37
Inter WORD	£36
Mega-3 ROM	£76
Spell Master	£42
TERMI	£25
Wordwise	£24

Wordwise plus

£40

We are giving away absolutely **FREE,** the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

Acorn ROMS

View 3.0 ROM	£45
View Professional	£50
Viewsheet (Acornsoft)	£36
Viewstore	£36
Viewspell with 80 track disc	£25
Viewplot Disc	£20
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MINI OFFICE II

DISC Version for BBC B & B+	£14.00
DISC Version for BBC Master	£16.00
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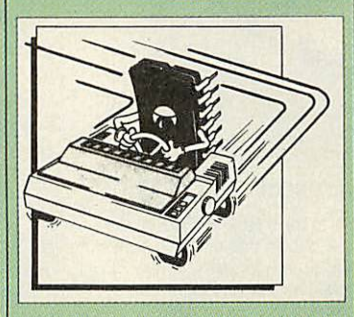
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View Printer Driver Discs

Epson FX & RX 80	£10
Juki & Brother HR	£10

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £33



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OFFICE MASTER



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- BEEBCALC SPREADSHEET
- BEEBPLOT GRAPHICS

DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features

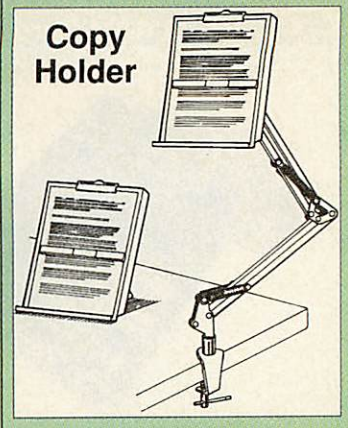
BEEBPLOT – Provides visual representation from Spreadsheet data.

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Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

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Angle poise **£12** (carr. £3)

The Epson RX/FX/KAGA Printer Commands Revealed Handbook

Printer Commands Revealed

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

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New Release

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Do you have to use both Acorn computers and PC's? Would you like to use your Archimedes or A3000 in PC-emulation mode but are unsure of the new commands?

Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quicly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

'ACORN TO PC' also acts as a handy reference guide to all Acorn star commands and their MS-DOS equivalents. It also has an extensive and readable explanation of the directory tree and hierarchical filing systems in general. Both DFS and ADFS Acorn systems are covered.

'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £15.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.

Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc, and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work – even giving advice on writing and marketing your own programs.

A book you will enjoy to use as a reference, or read from cover to cover, over and over.

Only: **£14.95** (No VAT)

The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.

Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's.

Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual.

(Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

Price: £39

(Please write in for technical literature)

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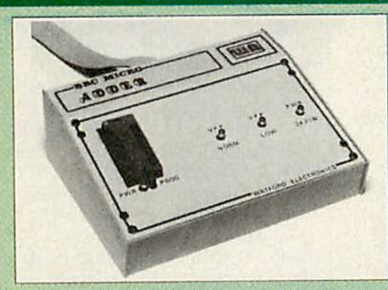
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ADDER



The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
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- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
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£65 (£5 Carr)

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EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

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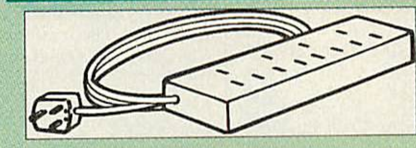
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Protection for only **£8.50**

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Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

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BBC to Disc Drives Ribbon Cable
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Disc Drive Plug 4 way	100p	–
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DS88LS120	£5.25
LM324	£0.45
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SAA5050	£8.75
UPD7002	£6.00
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27128A-250nS (12V5)	£2.50
27128-250nS (21V)	£4.00
27256-2	£3.00
27512-2	£4.50
27C101G (1 Meg)	£7.00
4013	75p
4020	£1.00
4164-10	£1.55
4464-10	£3.50
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6522A	£5.00
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68B50	£2.95
68B54	£7.50
7438	50p
74LS00	50p
74LS04	50p
74LS10	50p
74LS123	£1.00
74LS163	£1.00
74LS244	£1.00
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74LS393	£1.00
75453	£1.00
75159	£3.00
9637	£2.00
ICL7673PA	£3.00

Assorted ROMS



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ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
ACORN DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C Disc	£36
Acorn LISP	£19
Acorn OS B+	£25
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Termulator B, B+	£28
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The Watford IDE Interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes User. Over the last few years PC hard disc manufacturers have been working towards the goal of integrating the drive controller onto the hard disc, eliminating the need for an expensive controller card.

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The Watford interface allows IDE drives to work on any Archimedes machine, speeds equivalent to SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer tate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

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Software

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- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

*Commands

*IDEFS
Selects the IDE filing system 'IDEFS'.
*IDEDrives
Displays the configuration and native characteristics of installed drives.
*Configure IDEFSDirCache
*Configure IDEFSBuffers
*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek	20Mb	650K bytes per second
Seagate	43Mb	800K bytes per second

PRICES

Part No.	Capacity	Access Speed	Price
ADA 0520	44MB	28ms	£249
ADA 0530	89MB	19ms	£395
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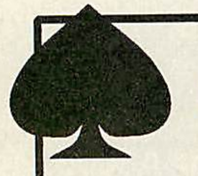
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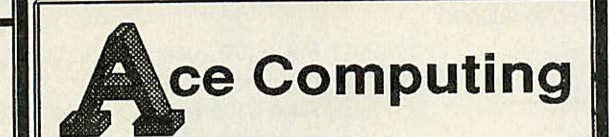
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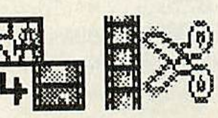


RISC OS Euclid is the best multi-tasking 3D graphics and animation system for the Archimedes. It is effectively a 3D version of Draw.

Mogul makes full use of **Euclid**'s unique hierarchical data structure to generate animations of 3D objects with articulated motion and simultaneous camera motion.

ArcLight is a multi-tasking ray-tracer which will generate a realistic Euclid picture, or a complete Mogul film, while you are free to get on with other work.

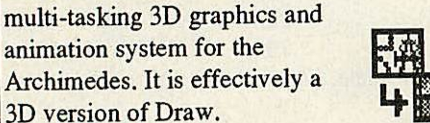




Tween produces films from Draw files. It uses techniques similar to **Mogul** and generates a film by calculating intermediate frames from a set of key positions.

Splice allows you to edit films produced by **Mogul** or **Tween.** You can even produce hand-drawn cartoons by converting sprites from any source.

Such is the enthusiasm for **Euclid** there is a user group called **Elements** , now in its second year, which provides a quarterly disk containing hints, tips, animations and user pictures.



ArcLight £50
Euclid £70
Mogul £20
Splice £30
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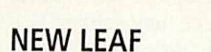
★INFO

DAVE ACTON and **DAVE LAWRENCE** deliver a monthly mix of bits and pieces for your eight and 32-bit computers

NATURAL BEAUTY

It may come as a surprise, but many examples of natural things can be 'digitised' – ie, represented mathematically, not scanned or frame grabbed from a video camera – and generated by a computer.

'Infinite variety' is a phrase often associated with nature, so trying to emulate it on a machine which is certainly finite and can only execute instructions in sequence may seem a bit of a daunting task. However, two programming concepts can be employed to achieve the 'impossible' to some degree. Therefore, for 'infinite' read 'recursion' and for 'variety' read 'random numbers'! In this section of *INFO there are four example programs which demonstrate (in quite different ways) how nature can be captured.



NEW LEAF

The first foray into the natural world appears courtesy of regular contributor, **Bryan Creer** (remember his herding from a couple of months back?) Bryan has moved away from sheep this month and has sent in a program that draws fern leaves – it even draws them in green to enhance their appearance. His original program (*Fern32)* only works on the Archimedes (due to its use of CASE and operations on arrays), however we have made the necessary alterations and BBC owners may use *Fern8* instead.

Bryan supplied us with a very elegant description of what the program does, which is outlined below.

The principle behind *Fern* is very similar to the *Sierpinski Gasket* (see *BAU* October 1990 and March 1991) – a figure made up of copies of itself. The Sierpinski triangle is built up from three half size copies of itself moved towards each corner. *Fern* consists of four copies of itself scaled to different sizes and rotated before being moved to their positions.


TAKING A LEAF OUT OF THE ACORN TREE

The four copies are:
1. The first branch on the right
2. The first branch on the left
3. The remainder of the fern from there and,
4. The stem from 'ground level' to the junction of 2 and 3. 4 is a bit of a cheat, since it can hardly be said to be a copy of the fern.

The transformations of 1, 2 and 3 are carried out by matrices set up in PROCcreatemats. Each point is rotated, scaled, reflected (in case 2) and translated. The CASE structure (or multi-IF in *Fern8*) shifts the odds in the random selection so that each copy is chosen in proportion to the area it covers.

As Bryan himself says, it is rather disturbing that a bit of mathematics can produce something so apparently natural – even more when you realise that something so clearly hierarchical relies on random numbers.

BRANCHING OUT

Bryan's *Fern* program uses random numbers for its variety, but no actual recursion. In fact, a recursive version of fern could be written, Bryan's version merely circumnavigates the need for it – good for him! **Barry Wickett's** *Trees* program does use recursion and, fairly obviously, it draws trees! There is one version only of the program which will work equally well on eight and 32-bit machines (it's just a tad faster on the Arc!) Barry based the algorithm used by *Trees* on the tree growing outside his bedroom window. He admits that some of results are rather peculiar, but he blames this on the fact that there are peculiarities in nature as well.

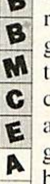
To draw a tree it starts by drawing a 'branch', which is defined by its x and y coordinates, its thickness and starting angle. The first branch has x picked randomly, y set to 0, an arbitrary thickness of 20 and an angle of 0 (ie, straight up). To draw a branch, circles are drawn of the given thickness along its length. At each 'step' x and y are moved a bit according to the angle, which is varied by a small amount to give a crooked effect.

When the branch reaches a certain thickness (see the nasty equation in line 270) there is a chance that a secondary branch is created at this point, so PROCbranch is called recursively to deal with it before continuing with the current branch. Line 280 adds leaves at random to a branch if it is thin enough. A branch is deemed to be 'finished' when it has a thickness of less than 1.

The program could easily be changed for different species of trees, but, as Barry points out, what is the difference between a rhododendron and a larch? If anyone produces a recognisable species we would be interested to see them.

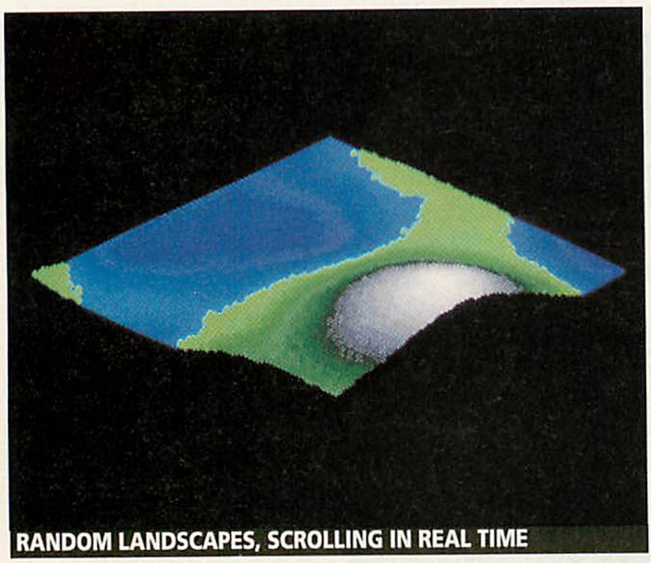

RANDOM TREES

WHACKY LANDSCAPE



Regular readers should remember the *Gwawp* program from the June issue that produced random, colourful 'oozing' patterns and the random landscape generator (*BAU* September 1989). Up to date, *GwawpScape* is an Archi-




RANDOM LANDSCAPES, SCROLLING IN REAL TIME

medes only program that somehow manages to combine these two in a sensible way.

It generates a landscape using the same incremental circle plotting routine used by *Gwawp* (for more details please refer to the June issue). Negative 'increments' are avoided and once a data value reaches 255 (its maximum) it stays there (the original *Gwawp* wrapped round back to 0 after this). The routine has been tweaked so that the circles are plotted to an arbitrary area of memory (of any size) rather than directly onto the screen, which allows larger landscapes to be generated.

When the program is run, it calculates the largest, 'squarest' area that can be dealt with and will use these values as a default. However, you may enter other smaller values if you wish, bearing in mind that the larger the area, the longer it will take to generate the landscape. The size of the landscape dictates how many hills are generated and this takes the time – on an 8Mb, Arm3 machine it can create a landscape 2816 × 2880 which needs about 10,000 hills and takes about nine minutes to run!

Once generated, the landscape is plotted isometrically on the screen (in a similar fashion to my original landscape program). The mouse can be used to scroll over the landscape and the left and right mouse buttons can be used to flood the landscape with water. As with the original landscape, the land is coloured according to its height and the water according to its depth. If you are feeling energetic, you could even add some beaches.

COAST IS CLEAR

There is an old riddle that goes something along the lines of 'how long is the coast of Britain?' The answer, if there can be said to be an answer at all, is that the length of the coastline depends on how closely you look at it. Every intricate headland or bay reveals, when scrutinised, a whole range of other headlands and bays. Zooming in on these would reveal yet more detail and, putting aside any arguments of atomic-level physics for the moment, the process would continue *ad infinitum*.

The coast is a 'fractal' – a curve that has dimension somewhere between 1 and 2. Sometimes these entities are called 'space filling curves' because of their unusual dimensional properties.

Whatever their name, they provide fascinating raw material for programmers.

CoastDemo works on eight- and 32-bit machines alike and illustrates how fractal coastlines can be built up. You start with a line, then bend it in the middle by a random angle. Each of the halves of the bent line may then be bent again, and so on. *CoastDemo* draws more and more intricate coastlines by increasing the number of times each part of the line is divided and redivided. Notice that the program is 'recursive' – the routine to break a line calls itself to break each of the halves. This is typical of fractal programs and you will have seen such techniques in the other 'natural' listings above.

Coast is a more sophisticated program that allows you to zoom in more or less indefinitely onto a fractal coastline. The added complexity means it is an Arc-only program. The basic shape is built up in the same way as *CoastDemo*. The difference is that, after plotting, the line is scaled to give the appearance of the viewer descending, as if from the skies. PROCprocess is the main routine that sorts out the individual points on the coastline and this has two main functions: first, any points which have moved off the screen are deleted; second, any segment of coast which becomes longer than a predefined minimum value (minlen%) is bent by a random angle.


FOLLOW THAT SNAIL!

Normally, when zooming in on a curve of 'infinite' detail you would run out of memory fairly quickly because of the continuing discovery of new headlands and bays. However, by maintaining a linked list of visible points, you can use memory freed by points moving out of view to store the positions of newly discovered points. Hence, you can zoom and zoom and zoom and there will always be more to see.

As *Coast* uses various trigonometric functions (although tables are employed to speed up calculations) it takes a while to construct and plot each frame. You can alter the value of minlen% to adjust the amount of detail seen and thus the speed of plotting.

Points are stored as four words of memory. The first two contain the x and y positions. To avoid the need for floating-point numbers, many of the variables in *Coast* are stored as integers and 'multiplied up' to provide extra accuracy. The other two values associated with each point are addresses of the next and previous points in the list. Either of these may be zero, meaning that the point is at the end of the list.

When a point is created, it is 'linked in' to the list. When deleted, points are 'delinked' – the memory is freed and the pointers of adjacent points are adjusted to cover up the 'hole' left. A second linked list (free%) is maintained and this consists of a chain of blocks of free memory. When a point is created one of the links in the free memory chain is removed and used for the new headland. Deleting a point returns the 16 bytes used to the free% chain.

A nice extension to *Coast* would be to fill the land and sea. For limited zooms this could be done quite simply although as you near the Earth (even though you never actually get any closer!) it becomes a little more tricky. You might start with the land at the top and the sea at the bottom and, two minutes of zooming later, the picture may have reversed, or a narrow headland may have appeared. It soon becomes very difficult to work out what is sea and what is land, and how best to draw them. If you come up with a neat solution then we would of course be delighted to share it with *BAU* readers!

SETTLING ARGUMENTS

When writing Arm code utilities, it is often useful to pass detailed parameters and flags to them to control their effects. The decoding of such parameters (as anyone who has written Rom code on a BBC or Master knows) is an extremely tedious process. Once you have done all the hard and interesting work of getting your program to work, you then have to spend twice as long writing intelligent routines to interpret what the

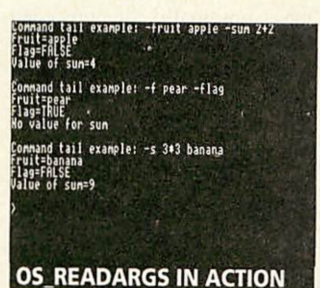


doziest of users has entered.

Risc OS provides a couple of very useful SWI calls to take most of the tedium out of parameter reading – namely OS_SubstituteArgs and OS_ReadArgs. As it happens, the *EveryWhere utility found later on in this very column makes practical use of both calls. In the meantime, here are a couple of fairly frivolous demonstrations of how to use them.

OS_ReadArgs is potentially a very powerful call. It takes a string, often the tail of a star command, and looks through it for named parameters or 'keywords'. These are provided as a special string which not only contains the keyword names to search for but also information about their type.

If you've ever used utilities like Acorn's macro assembler



OS_READARGS IN ACTION

AASM or the *ANSI C* compiler, then you will be familiar with the sort of thing OS_ReadArgs is looking for. Parameters are included with a hyphen (-) as a prefix (this notation is used extensively in *Unix*TM).

Any values required are generally placed after the appropriate keyword, although this is not compulsory. *ArgDemo* illustrates the three basic keyword types – simply run it to see the effect.

The keyword list is stored at key%. Each item in the list is stored as a name followed by qualifier letters (each preceded by /). The first in the list is 'fruit'. which is defined as type 'a'. This means that a value must always be given. The next is 'flag', type 's', which means it is merely a flag and its presence or absence is noted by OS_ReadArgs and can be checked by your utility when necessary. The last named parameter in the example is 'sum', which has an alias 'calculation'. Either word may be used in the string validly. This is type 'e', which means OS_EvaluateExpression will be called by OS_ReadArgs to evaluate the number or expression given. Two simple sums are included in *ArgDemo* to show this.

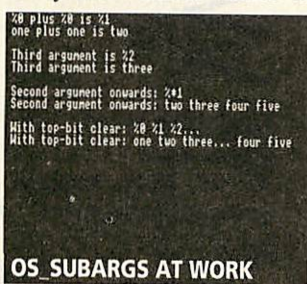
For each parameter given in the list there is a four-byte word in the output buffer. After OS_ReadArgs is called, each word generally contains 0 if no value was supplied, or a pointer to the value if present. In the example, '-fruit apple' would result in a pointer to the string 'apple' being placed in the output buffer word for 'fruit'. Integer expressions like 'sum' are stored as a single byte (containing 0) followed by four more containing the value itself.

Flags can be either false or true and their words in the output buffer have either zero or non-zero contents accordingly.

Keywords may have as many qualifiers as required. The other permissible ones are:

'k' – keyword must precede its value. Typically one parameter is more important than the others and you might not want to have to type its keyword each time. In this case, make all other parameters type 'k' and any 'leftover' value is assumed to belong to the remaining keyword.

'g' – expression is passed to OS_GSTrans. This allows the inclusion of control characters or system variable names in



OS_SUBARGS AT WORK

parameter lists. Type 'g' keywords have their values stored as two-byte lengths followed by unterminated strings.

OS_SubstituteArgs is a simpler call, taking a 'template' string and replacing special tokens in it (marked with '%') with items from an argument list. The short listing *SubsDemo* shows how to use the call. Basically, *%n* in the template string will be replaced by the nth element in the argument list. %*n gets replaced by all arguments from n onwards. Normally, any unused arguments are tacked onto the end of the result string, but as *SubsDemo* shows, this can be suppressed by setting the top bit of R0.

OS_SubstituteArgs is most often used in the context of system variables. Commands that are aliases of others (type *Show for some examples) often need to have one or more parameters passed onto them.

AT YOUR COMMAND

In February 1990, an eight-bit utility called *AllDirs*, written by **Joe Abley**, appeared in Hints and Tips. It allowed a single command to be applied throughout a directory tree. We thought an Archimedes version was more than overdue so here it is – *EveryWhere. Such a command has many applications – it can be used to unlock all files on a disc or provide information about them, merge all text files in a given directory, find a missing file, and so on.

The final version of *EveryWhere turned out to be a good deal more sophisticated than originally intended – we hope you'll find it useful.

*EveryWhere is a 'utility', assembled by EverySrc and saved in your current library. Once this is done, type *EveryWhere -help and you will see what valid parameters may be supplied. Often only one will be needed – a star command that you would ordinarily type in by itself. For example, to unlock the files in the current directory you might well type *Access * WR.

To unlock all the files on a disc, you could use *Everywhere "Access * WR". The utility simply goes into each directory and executes the command given in quotation marks. (Note that if your command has any spaces in it you must use quotation marks to avoid confusion.)

Often you might want to apply a command to a given directory (possibly on another disc or filing system). Here you would use -directory or the abbreviation -d. To unlock the files in $.Junk in drive 0 you might type:

*EveryWhere "Access * WR" -d adfs::0.$.Junk

Note that you should not use @ (meaning 'current directory') in the parameter following -d. @ has no constant position and so will change as *EveryWhere descends the directory tree, thus confusing it!

Occasionally errors might occur when going through a directory tree. If an error is caused you will generally be left in the appropriate directory so you can find out what's wrong. You may however suppress errors by following the command with -quiet which ignores any that occur. For example, *EveryWhere "Info C*" will attempt to display information about all files beginning with C. If a directory contains no such files an error is normally generated but if you append -quiet to the command the search will continue regardless.

So you can see what's going on there is an option -verbose which displays directory names as they are encountered. Also, if you are using the -file option (more on this in a moment) each command is printed on the screen before being executed, so you can check it's working correctly.

Perhaps the most important flag though is -file which (subtly) alters the way your command functions. Normally each directory and subdirectory is entered and the command you supply is executed in each. Sometimes though, it is necessary to perform specific actions on files, and with the -file option you may execute the given command on each file encountered. Where the filename would normally appear in the command, %0 should be placed in the string supplied. OS_SubstituteArgs (described above) is used to replace this symbol with the appropriate filename as it is encountered. For example, imagine you had two files on your discs – Fred and Jim. The command:

*EveryWhere -f "Info %0"

would actually have the effect




```
)*EveryWhere -D :4.$.*Info.Aug91 -C "Info *8" -V -Q
*Dir :4.$.*Info.Aug91
*Info *8
Fern8      WR  BASIC     12:49:45 14-May-1991 2004  bytes
Font8      WR  Data      16:52:22 30-May-1991 3040  bytes
MakeFont8  WR  BASIC     16:51:53 30-May-1991 1328  bytes
MakeText8  WR  BASIC     12:11:53 28-May-1991  658  bytes
Scroll8    WR  BASIC     16:52:53 30-May-1991    5 Kbytes
Text8      WR  Text      12:10:15 28-May-1991  212  bytes
*Dir :4.$.*Info.Aug91.!everyw
*Info *8
*Dir :4.$.*Info.Aug91.!everyw.Chapter1
*Info *8
*Dir :4.$.*Info.Aug91.Shots
*Info *8
Scroll8    WR  Sprite    01:28:35 31-May-1991   80 Kbytes
)
```

*EVERYWHERE – MILLIONS OF USES

of the two commands:

*Info Fred

*Info Jim

Similarly, the command *SetType can normally only be applied to one file at a time, but using

*EveryWhere -f "SetType %0 Text" -d $.MyDir

would change all files in directory $.MyDir to type 'text' in one fell swoop!

An extension to the -file option is -type which takes a filetype (either by name or number). You might like to compress all sprite files in one go, or merge all the text files in a directory. This latter example could be done with:

*EveryWhere -t text -d $.MyDir "Type %0" { > RAM:AllText }

All text files in $.MyDir are *TYPED and the resulting output redirected to a file called AllText on the Ram disc. If -t is present (the abbreviation for -type) it is assumed that you are using the file option, even if -file is not present.

So that you can test out the more drastic operations, a special option -noexecute has been included.

This automatically sets the -verbose flag and prevents your command being executed in any directory or on any file.

In other words, you are presented with a list of the star commands that would have been executed had you done it for real. If the list is as you expected, repeat the command but without the -n flag.

One last option may come in useful if you want to perform some operation on the contents of a directory but not on any subdirectories.

The -single parameters ensures that only the root directory or the top level of the directory specified is affected by the command. (So, if the file option is not present the command is only issued once in total!)

*EveryWhere, like all utilities, is loaded into a temporary piece of RMA space. When it has finished its task, this memory is freed again.

Every utility is guaranteed 1K of workspace and this is pointed to by R12. *EveryWhere makes full use of this space! The tail of the command is copied to command and then it is processed with OS_ReadArgs.

This creates at table a list of pointers to the values of the various flags and parameters supplied by the user. For example, table+cmd_v contains 0 or a non-zero value depending on whether -verbose was used.

If a filetype was given it is first assumed to be in text form and an attempt is made to decode it using OS_FSControl 31. If this fails, you then try to read it as a number with OS_ReadUnsigned.

The command itself (which may optionally be preceded with -command) is examined. If it is a null string its entry in table will be zero. If so a null string is placed at command, otherwise the given string is copied there.

If help was asked for (-help) this is displayed nicely with

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OS_PrettyPrint and no more action is taken. Otherwise, the program moves on to find out the current directory so you can return to it when you've finished.

Herein lies a problem. It seems there is no easy way of reading the full pathname of the currently selected directory. It's possible to read the directory name with the OS_GBPB 6 and *EveryWhere uses this call to build up the pathname by repeatedly reading the name and then moving up a level until $ is reached. This is an unsatisfactory way of going about matters though and we'd be delighted to hear from any readers who know of a neater way of finding out where you are!

Next the disc name is read with OS_GBPB 5. Another problem crops up here because discs formatted as type L on, say, a Master Compact will not have a name.

Because you can't read the current drive number (do you know how it's done?) you cannot reliably return to your starting place after *EveryWhere has done its stuff. Fortunately, problems will only occur if you run the utility from an old, unnamed disc with reference to another drive.

If you're the sort who still uses unnamed type L discs then you only have yourself to blame! If a name was found though, it is stuck on the front and then the filing system name is found (by reading the FS number with OS_Args and turning it into a string with OS_FSControl 33). This too is added to the full pathname and now the main business of the call can begin.

The core of the routine is simple. OS_GBPB 10 is used to read the objects in a directory one at a time. If an object found turns out to be a directory, the routine calls itself and the next level down is examined before returning to continue the search at the current level. The whole tree is examined in this manner.

If -file was used OS_SubstitueArgs is employed to insert the filename into the command, which is executed for each file found. Whether or not -file is present, the subroutine checkerr is called to clear any errors that occurred following the OS_CLI if -quiet is given. You many find it useful to add commands to your library that make use of *EveryWhere. For example, why not create an obey file (using *Edit*) called Unlock that contains the following line:

```
EveryWhere -d %0 "Access * WR"
```

Then, to unlock all the files in directory $.MyDir say, you would only need to type:

```
Unlock $.MyDir
```

SCROLL ON SUMMER

B B M C E A — Have you ever stared in awe at an Archimedes demo and wondered how they do those amazing things? Well, we can't work miracles here, but **Garry Hill's** *Scroll32* program will at least show you how to produce a simple 'scroll text'.

You will need to run *MakeFont32* first to create the font and *MakeText32* to create a sample text file.

The first byte should contain the default scroll speed as a multiple of four plus 32. Various Ascii codes can be embedded to vary the scroll. A &00 should be followed by a new scroll speed character (as above) and two-byte 'number of cycles' = (byte3-32)*256+byte4. &01 will do a VDU 7 (the next three bytes should be &00). &02 sets a new default speed (as above), bytes 3 and 4 should be &00. &04 sets a new text window size. Byte 2 = new value of start%+32.

Bytes 3 and 4 are set as for code &00, but set a new value of finish%. &0A or &0D is used to mark the end of the text.

For BBC owners I have written a 6502 program that produces a similar, but not identical, effect to Garry's Archimedes program.

You'll need to run *MakeFont8*, *MakeSin* and *MakeText8* before running *Scroll8*.

As with the 32-bit version, codes can be embedded in the text. &00 controls the speed of the sine wave. It should be followed by a one-byte speed (0, one, two, four or eight) and a one-byte duration, after this

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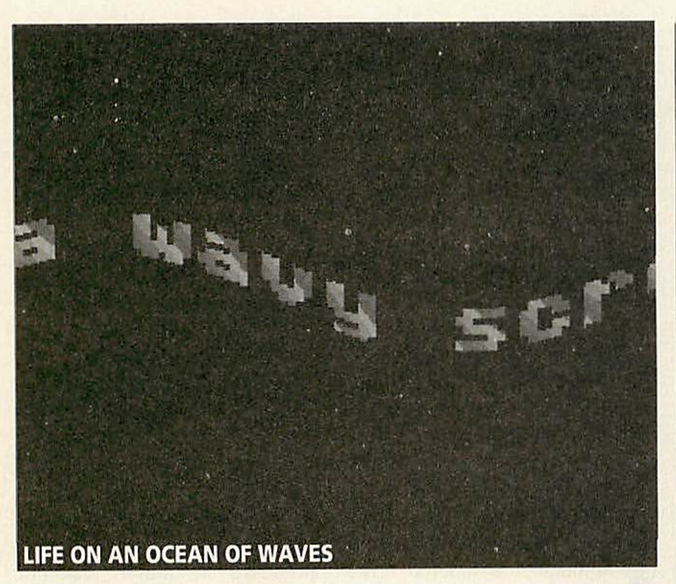
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LIFE ON AN OCEAN OF WAVES

it will return to its previous speed.

A duration of 0 means change to this speed from now on. &01 controls the text scroll speed. It should be followed by a single byte speed as with the sine speed but no duration byte is required. The end of text is marked with an &04 (EOT) character.

The demonstration text files, *Text8* and *Text32*, on the yellow pages should provide you with enough examples to work out what is going on!

*QUIT

If you have an item to contribute, be it program, hint, tip or simply an idea, do write in to *INFO at the address below. Any comments, suggestions or even complaints are all equally welcome.

Programs, aside from the very shortest, should be sent on disc together with sufficient explanation of how they are to be used and how they work. Where possible we will supply BBC/Master versions of Archimedes submissions and vice versa. Of course, if your program works on the whole range of machines then so much the better.

Any submissions too long to carry as listings in the yellow pages may find a home on the monthly disc, so don't despair if you've written some 2000 line masterpiece that you'd like to share with the discerning *BAU* readership!

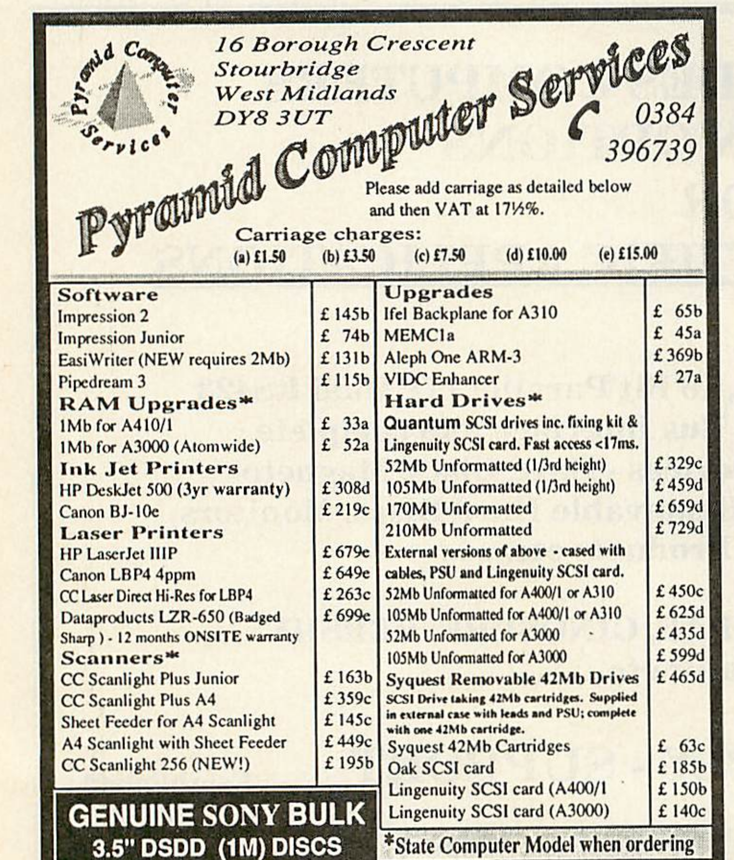
Submissions should be sent to us at: *INFO, *BBC Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. If you enclose a stamped address envelope it will ensure a speedier reply and a return of your disc(s).

COMPATIBILITY KEY

- B — BBC B compatible
- B+ — BBC B+ compatible
- M — Master compatible
- C — Master Compact compatible
- E — Electron compatible
- A — Archimedes compatible
- BBC A3000 compatible

★INFO COMPATIBILITY TABLE

	BBC B	Master	Electron	Arc
Info 1a (Fern32)				★
Info 1b (Fern 8)	★	★	★	★
Info 2a (Trees)	★	★	★	★
Info 3a (GwawpScape)				★
Info 4a (CoastDemo)	★	★	★	★
Info 4b (Coast)				★
Info 5a (Argdemo)				★
Info 5b (SubsDemo)				★
Info 6a (EverySrc)				★
Info 7a - 7c (Scroll Text 32)				★
Info 7d - 7g (Sroll Text 8)	★	★	★	★



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FROM SCALPEL

When the BAU team decided to produce the magazine on the Archimedes, there was no going back. Here is the inside story of how and why we did it



If you have ever tried, or thought about, desktop publishing – to produce your own school newsletter, create club posters or even produce your own novel – it all boils down to producing some kind of document.

If you imagine this magazine as one large and very complex document, you can glean some idea of the challenge facing the *BAU* team when we decided to produce the magazine using desktop publishing.

The task took on gargantuan proportions when we decided that, as an Acorn magazine, we should try an Archimedes-based DTP system. Cautious advice about possibly using a 'tried and trusted' Apple Macinotosh or PC-based system was thrown to the wind – it would be Arc or bust! Remember that *BBC Acorn User* was to be the first newsstand magazine to be produced using a system that had largely been unproven in a professional publishing situation – the term 'guinea pig' immediately sprang to mind!

Before any magazine goes down the desktop publishing road, a number of factors – including cost, time saving, design and production quality – have to be analysed and compared with conventional publishing methods. There can be many advantages in using DTP, not least of all the speed at which pages can be produced from scratch – for example, you *can* take text and illustrations and design and edit a page layout ready to go to the printers within a few hours.

Time and money is saved compared to conventional methods, although the editorial team effectively takes on the typesetting role, thereby not spending as much time on other editorial matters – such as playing with the latest version of *Interdictor*!

However, in this 'swings and roundabouts' scenario, the pros usually outweigh the cons – which is why more and more publications are being produced using DTP.

Fortunately, *BAU* had already had a trial run with DTP. Graham Bell, former *BAU* editor and now Redwood Publishing's computer systems manager, had already successfully produced two supplements for the magazine using an Archimedes-based DTP system. So we knew the Archimedes 440/1 machine was up to the task, and that the newer A540 would be even better because of the increased speed it offered.

Graham had already tried a variety of DTP software packages which were compatible with the Archimedes, and decided in favour of Computer Concepts' *Impression 2*. The choice of other peripherals – such as monitors, scanners, printers, and other supporting software – had also been made in principle.

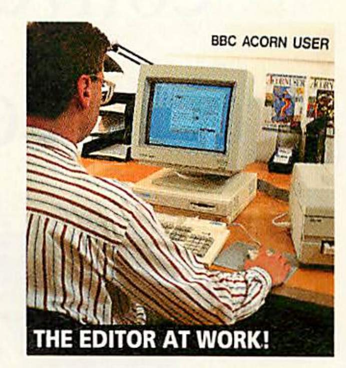
The move over to DTP also coincided with the requirement to redesign the magazine and the Archimedes was used to produce dummy layouts before a final choice was made. *BAU* contains a variety of page designs, from news to features, so a range of page templates were made in *Impression* to be selected for whichever page was to be designed.

Each template contains exact column widths (two, three or four columns), with page headers and footers, folio number, and so on. Each template also contains a style menu so that, for example, when text is imported, it automatically appears in the correct typeface.

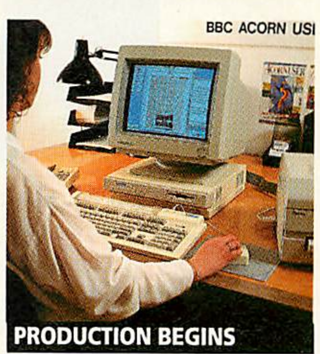
In setting up the DTP system, we approached all the various companies in the Acorn marketplace for help and support. In addition to hardware and software support from Acorn and Computer Concepts, other supplies included Taxan monitors, Oak Solutions' *Sharer* and *Spooler* software and an Irlam scanner.

Apart from the editorial team, our regular contributors also produce text (and sometimes rough layouts) using *Impression*. This can save even more time on the editorial production schedule and allows us to extend our deadlines to cater for last-minute reviews of the latest software, or vital late changes to a price or specification. This means that readers can have the latest information within days of the last pages of the magazine being written.

To give you an idea of how the DTP system works, production editor Pauline McLernon has detailed the day-to-day operation below.



THE EDITOR AT WORK!



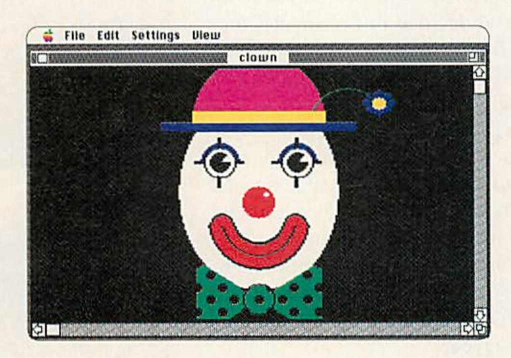
PRODUCTION BEGINS



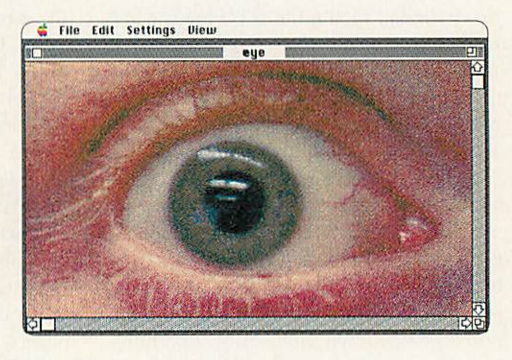
LAYOUTS ARE CHECKED

TO SCREEN

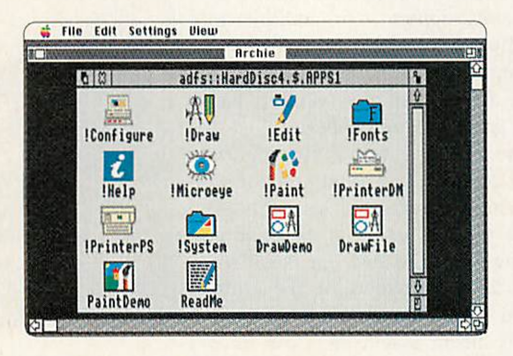
Announcing colour graphics conversion between the Acorn Archimedes and the Apple Macintosh



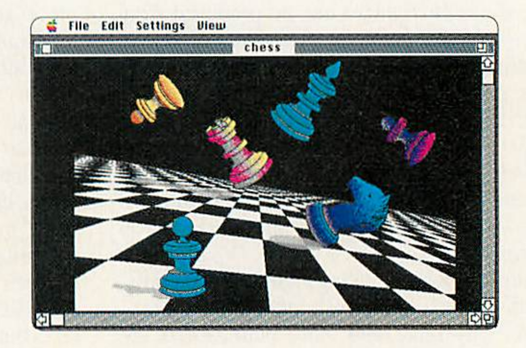
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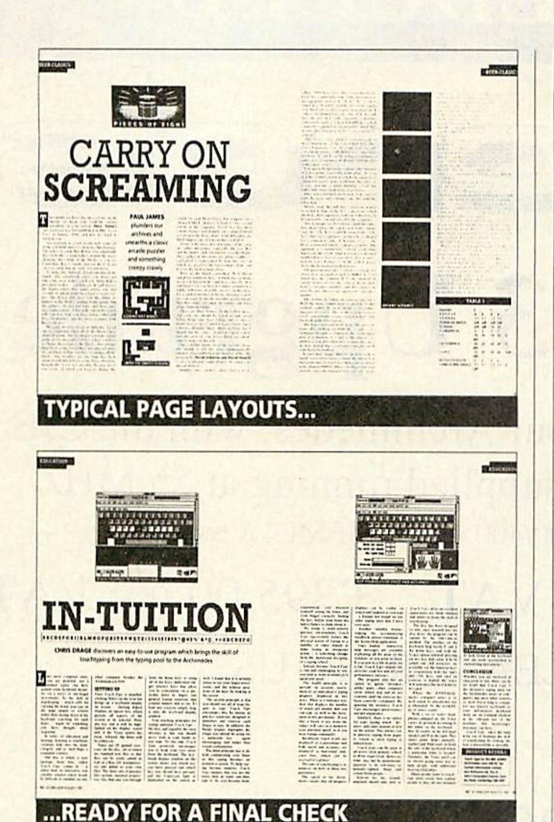
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TYPICAL PAGE LAYOUTS...

...READY FOR A FINAL CHECK

Have there been any problems? Well, only a few minor ones, such as the odd 'program abort' message, or power cuts (saving regularly helps avoid losing a day's work!), and general unfamiliarity with the system in the early stages. However, this issue is the fifth to be fully produced using the system and the general consensus among the editorial team is that we would not go back to the conventional methods of production.

As a 'live experiment' in Archimedes-based DTP, we are feeding back our successes and problems to both Acorn and Computer Concepts to help them achieve still further improvements in their products.

The fact that the editorial team were able to get to grips with DTP production of the magazine without any previous experience and within a relatively short timescale says a lot for both the user-friendly Risc OS environment on the Archimedes and the ease of use of the *Impression* software.

We seriously believe that Acorn and supporting software companies have a genuine opportunity to market a similar DTP package to the consumer and business markets as a serious alternative to Apple Macintosh and PC-based systems.

Over to you, Acorn...

Barry Monk

WHAT WE USE

Archimedes 440/1s are used by the editorial team and our designer has a 540. The 440s are connected to Taxan 795s and the 540 a 20in Taxan Multivision 970, all fitted with Atomwide VIDC enhancers .

To print out pages we have two LaserDirects, and our designer has a 600dpi LaserDirect Hi-res. Econet, running on an SJ fileserver, is used to transfer data between machines, using Oak Solutions' Sharer. Colour printouts are done on an Integrex Colourcel.

PRODUCTION

As Barry has already mentioned, this DTP 'thing' was something we had no direct experience of only six months ago. Yet now *BAU* is fully produced using the Archimedes. So, how have we managed it?

Compared with the conventional typesetting method of producing a magazine, the DTP solution takes away a lot of the running around. Now (sigh!) most of the work falls on us here at Redwood.

Almost all of the articles arrive here on disc, and once these have been entered onto our system, and a paper copy filed, they need to be edited. This can now be done on screen, and gone are the bad old days of sending it back to the typesetters two or three times for correction. When we are happy with how the article reads, it is brought to the art room.

At this stage, a discussion takes place about what illustration the article needs (photos, cartoons, artwork, etc) and how it should be designed. Once you get used to the software, designing a page with DTP is much easier than with a scalpel and sheets of text. Text can easily be moved around, put in boxes, enlarged, emboldened, etc.

Artwork can be sited in alternative places to get different effects. You can try many combinations of design to get the layout that looks best. In the past, you had to imagine what a particular effect would look like and then pray that the typesetters would get it right. *BAU* has an added advantage in that we are dealing with an Acorn subject, so our screenshots can actually be transferred from a software package directly onto the page so we can get an idea of what they will look like – it used to be a case of holding transparencies up to the window!

The master pages (templates) we use are invaluable. These can be scaled up to get greater detail, or scaled down to get an overview of an article of more than one page.

When everyone is happy with the general design of the article, the layout is transferred from the artroom to the editorial office via Oak Solutions' *Sharer* software. The article is now reread, and cut or extended to fit the final layout. We can lay grey tints at this stage, check all rules and boxes are in place, write captions and check page numbers. When we are completely satisfied with the page, it is printed out on the Qume Laser-Direct for a final read.

The colour scheme for the page can then be decided, and this is marked on our printed version which, along with the artwork, is sent off to the colour reproduction house.

Meanwhile, the article is transferred to a Postscript disc and sent to an origination bureau, where it is made into film. The film is then combined with the colour material and sent to be printed.

Next month, Graham Bell will explain just how an *Impression* document is converted to Postscript and what happens to turn it into your printed *BBC Acorn User*.

Pauline Mc Lernon

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A FIRM HANDSHAKE

In the last of our comms series, **IAN BURLEY** looks at intelligent modems, file transfer protocols, handshaking and how you can log onto Acorn's SID

Last month I explained how you can pick up simple manual dial modems for as little as £20 each. If you've been bitten by the comms bug, something a little more sophisticated will be necessary. The simplest automatic modems allow auto-dialling and sometimes auto-answering. Early auto-dial modems were rather crude and could generally only pulse dial. Examples of such modems include the Voyager 7, Apollo, Demon, Miracle Systems, Kirk Enterprise and the Designer Modem.

However, with modem prices steadily falling, you could go for what is known as an intelligent or 'smart' modem, most of which are Hayes command compatible. Basically, this means the modem has its own processor and operating system and a simple command language.

You can go on-line to the modem and type in commands to configure or activate the modem. It is now more usual for intelligent modems to have non-volatile memory to save settings and telephone numbers.

Most modems now use a superset of the original Hayes AT command set. For example, to tell the modem to go into auto-answer mode you would issue the command ATS0=n, where n is the number of rings to be detected before the modem answers the phone and S0 is the register number the auto-answer routine points to.

If S0 is set to 0, which is usually the default, the phone will not be answered by the modem. You can look at the contents of a register by typing ATSr? where r is the S register number. S regisers contain values which dictate all sorts of modem functions, from inactivity timers to handshaking settings.

To ask the modem to dial a number and go on-line, if a carrier is detected you would issue the command ATDn where n is the telephone number. The default is usually pulse dialling, but by inserting a T (as in ATDT) you can usually ask the modem to use touch-tone dialling.

Commas can be inserted in the phone number to introduce a couple of seconds' delay – useful if you have to wait for a second dial tone for example. A 'W' modifier will even make the modem wait for a dial tone. Some modems can store phone numbers using a command like ATDS=n, where n is the number of the desired telephone number store, usually somewhere between 0 and 19.

So, now you can make the modem dial conveniently for you – but what about modem speeds? Once again, most intelligent modems offer automatic speed detection and will attempt to connect at the highest compatible speed. Otherwise, the modem will try to connect at the speed your terminal software is set to. Modems which offer data compression (MNP and v42 protocols for example) can offer speed buffering, which means you can talk to the modem at, say 9600bps or even higher, regardless of the actual modem connect speed.

If you are using MNP5 or v42bis data compression, it is essential to pass data to and from the modem as fast as possible because the modem will effectively shunt data down the line faster than its actual connect speed. The bottleneck should never occur in the terminal to modem link.

HANDSHAKING AND FLOW

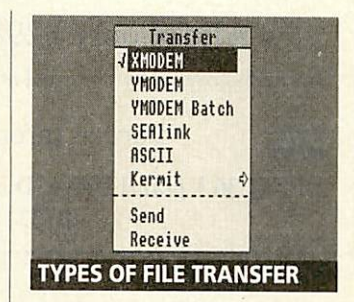
The faster you go the more important it is to employ flow control methods, either using *XON/XOFF* software control or RTS/CTS in hardware. If flow control is not employed you are likely to lose data if a buffer overflows.

A multitude of flow control options can be set via AT commands and these vary from modem to modem.

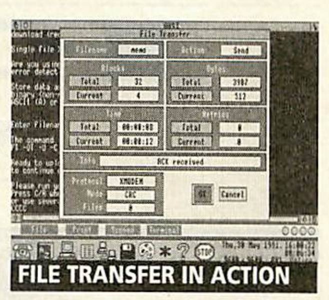
MNP or v42 error correction and data compression are very desirable if supported by the host system you want to log into. These options, if available, can also be configured by AT commands, though once again they tend to vary a lot.

Most decent systems support 2400bps and at least MNP error correction so if you can afford it, go for a modem which supports these two options. These are the best value at present, though v32 (9600bps) modems are dropping in price quite rapidly.

Another non-standard modem type in popular use is the US Robotics or Miracom Courier



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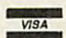
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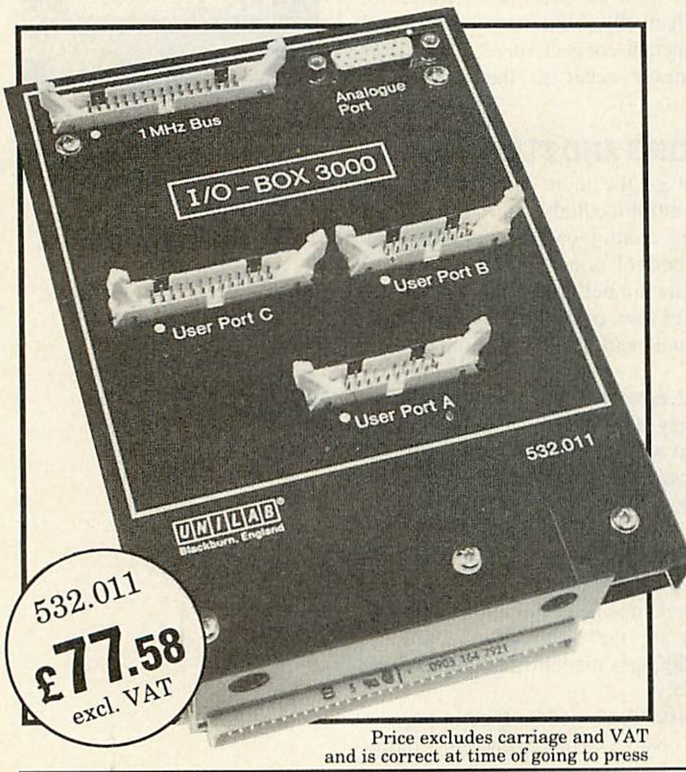


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HST. This is an early 9600bps system which only offers one 9600 channel – v32 offers a full duplex 9600/9600 link. HST modems are very common on BBs and despite the rising popularity of v32, HST remains popular, but you will need an HST compatible modem to use this feature. Later HSTs are dual standard and offer v32 as well.

FILE TRANSFERS

Once you are on-line you will want to download and even upload files containing software, messages, etc. You can do this directly to someone else with a modem (a process known as user-to-user, or U2U), or logged onto a BB (bulletin board) or other host system.

Depending on the terminal software you are using, you should have a wide range of options. The simplest is an Ascii file transfer or text capture by spooling the screen to disc, which is commonly used for electronic mail messaging, especially for short files.

If you are sending or receiving programs or data, it is better to use an error corrected file transfer protocol like XMODEM, YMODEM, ZMODEM, etc.

On viewdata systems like Prestel/Micronet you will need to use a CET or FCET telesoftware downloader. These file transfer protocols send data in blocks from as little as 70 bytes to over 1K. Each block is checked for errors as it is received – if an error is detected (most likely caused by line noise), the receiving computer will ask for the faulty block to be re-transmitted.

With Archimedes files, which tend to be enormous, files may be compressed using something like Arc or Zip utilities. You will need the relevant utility to decompress or un-Arc (or un-Zip) such files.

If you have been following this series for the past three months, then I hope I have managed to persuade you to explore the world of on-line comms – just give it a chance and wait for the bug to bite!

LOGGING ON TO SID

Acorn has an on-line Support Information Database (SID) for Acorn users to log into. Based at Acorn's offices in Fulbourne Road, Cambridge, the database is a custom viewdata system running on a network of Archimedes machines, each acting as a connection node.

For full access to SID's telesoftware, discussion boards, electronic mail and news, etc, you will have to register with Acorn or use the Micronet Prestel service, which has a gateway to SID which automatically registers new users.

You can sample a limited selection of SID's delights by dialling the (0223) 243 642 guest access number. Set your modem to any speed between 300 and 2400bps (the faster the better!), set your comms software to viewdata terminal emulation and the word format to seven bits, even parity, one stop bit (7E1).

Currently SID costs £10 a quarter with optional local access charges of up to 8p a minute. Micronet access to SID costs just a penny a minute off peak – there's no separate SID standing charge and that's at local call rate too. For further details call Acorn on (0223) 245 200.



JARGON BUSTER

AN AT-A-GLANCE GLOSSARY OF COMMS TERMS

- HAYES COMMANDS A set of commands, usually prefixed by the letters AT, devised by the Hayes modem company for controlling its Smartmodem line of intelligent modems. Now adopted and expanded on by the modem industry
- XMODEM A universal and perhaps the simplest error corrected file transfer protocol in use. Sometimes suffixed CRC for cyclic redundancy check version or Checksum for the simpler original checksum method
- YMODEM A development of the Xmodem protocol designed to handle batches of several files instead of just one at a time
- ZMODEM The next level of sophistication on from Ymodem. Features a resume mode if the link is cut for some reason – useful for long file transfers as you don't need to start right at the beginning when restarting your transfer. Block sizes are variable according to the rate of error detection – in other words, Zmodem can compensate for better links by sending longer blocks which are more efficient to transmit quickly. Zmodem is also streamed, which means data is sent in a continuous stream unless interrupted by a detected error
- SEALINK A fast windowed file transfer protocol. Windowed file transfers are designed to cope with links which can experience time lags, eg, over long distances. The sending computer does not delay the transmission of the next block by waiting for a request signal
- CET TELESOFTWARE CET stands for the Council for Educational Technology. CET Telesoftware conforms to the frame-based viewdata downloading protocol first developed by the CET for systems like Prestel. Unfortunately, this seven-bit protocol can be very inefficient and an enhanced version was developed for Micronet called FCET
- ARC A file compression standard often used for cramming as many files onto a disc as possible as well as reducing file transfer times. The Archimedes version is called Spark and is available from Beebug. A decompress-only version in the public domain is called Sparkplug. This is essential for downloading files from most BBs and Prestel these days
- ZIP Another file compression standard more commonly used by BBs dedicated to IBM PC users. Later versions of Spark and Sparkplug can read Zip-ped files
- MNP Stands for Microcom Network Protocol. Microcom is a major US modem maker which has developed some widely adopted link level error correction and data compression protocols described as MNP levels. In almost universal use today by error correcting modems are levels four and five. MNP4 is a synchronous error corrected link. As the link is synchronous, no start and stop bits are required so making the link more efficient. MNP5 is a medium level data compression system which can dynamically compress transmitted data by up to about 50 percent depending on the type of data. MNP is only usable when connected to another MNP system
- v42 The CCITT error correction and compression standard (v42bis). v42 includes MNP4 compatibility. v42bis is a more efficient data compression system which can achieve compression ratios of up to four-to-one. v42bis is also better at handling mixed data transfers or pre-compressed files than MNP5. Most new modems support v42 and v42bis
- RS232 SERIAL PORT CONNECTIONS:

RX Receive data
TX Transmit data
RTS Ready to send signalling. Essential for hardware flow control
CTS Clear to send. Like RTS, an essential signal connection for hardware handshaking. Can be substituted by DSR in the Archimedes
DSR Data set ready connection. Used instead of CTS on the Arc due to a hardware bug
GND Serial port ground
DCD Data carrier detect
RI Ring indicate connection

- HANDSHAKING Where computers and modems at each end of a link can start and stop the flow of data – flow control, for example, if a buffer is full or the user wants to stop the transmission temporarily. Hardware handshaking is acheived via RTS and CTS serial port signalling. Software handshaking is achieved via XON and XOFF control characters
- XON/XOFF Software flow control control characters. XOFF (CTRL-S) asks for the data flow to be halted. XON (CTRL-Q) signals that transmission can be resumed. Can be used on the simplest three wire serial interfaces if supported, but not as instantaneous or reliable as hardware handshaking using RTS and CTS

DUMP THAT SCREEN

CHRIS DRAGE examines how the right software can help you make the most of your printer and your printouts in the classroom

Last month I looked at a number of colour printers suitable for use in schools. However buying the right hardware is just the beginning – it is the software you buy that will help you to get the most out of it.

A printer represents quite a substantial investment and one which, surprisingly enough, is often regarded by non-computer literate members of staff as wasteful. Therefore any software that maximises the opportunity to use the printer creatively and imaginatively must be welcomed.

In the classroom one of the most frequent requests is inevitably for a hard copy of a particular screen. I also find it particularly useful to have selected screen dumps ready to show to children when introducing a new piece of software. As you can imagine, ideas for using screen dumps are legionary: they can be used as part of a project display; for Christmas and greeting cards; for incorporation into work and activity sheets, and for integration into a school magazine or newspaper. They can also be used to create OHPs and fabric transfers – the Integrex 132 Colourjet printer is particularly good for this.

Quite often the software only provides a printout facility at another point in the program from that which the child requires. It is even more common not to have a printout facility at all – ESM's popular program, *Podd*, is a classic example of this.

The problem is, how do you capture the screen you want when the program is actually running? Possibly the simplest means to obtain a copy of a screen from a BBC B computer is to use ESM's *Colour Screenprint* program. This Rom allows programs to be interrupted at any time while they are running and the screen dumped to various colour printers. Just two key presses, CTRL and P, are all that is required to freeze the program and send the screen data to the printer. After the dump procedure is complete, the host program continues as normal. As the program resides in a Rom it is always available until disabled with a command. It also allows a command, *SPRINT, to be included in user programs to obtain the same effect.

The range of printers supported includes the Canon A1210, PJ1080, PJ1080A and Star LC-10 colour printer, ribbon printers and the ubiquitous Integrex 132 Colourjet. The results from the Integrex are especially pleasing. Naturally, *Colour Screenprint* will not be able to dump every screen as some programs are coded in such a manner so as not to permit intrusions! However, I have found that it will happily dump a high proportion of the software commonly used in schools. The accompanying handbook is very easy to understand, and it contains an excellent section on the uses of *Colour Screenprint* in the classroom.

For BBC B and Master 128 computers the best screen dumping comes from 4Mation's *Snatch* software, which is a Rom image which must be loaded into sideways Ram. This is provided on the Master 128 and Compact, but can be obtained for the BBC B. Once the software has been loaded it requires a specially formatted disc to be created onto which the screens can be saved. Master 128 owners can take advantage of their computer's ability to create an ADFS 640K disc in order to store a large number of snatched screens. Not only can a screen be snatched and dumped to the printer while a program is running, but it can also be saved to disc and expanded, its colours altered and a selected part printed and resaved.

Saved screens, and part screens, may be used in art packages such as *Image*. If that is not enough a pixel editor is also included to enable captured screens to be edited and altered.

Teletext and dual-mode screens are all catered for, as are a range of printer types: Epson LX80 and LQ800 (and compatibles) and the Integrex Colourjet 132. The Integrex double density dump is truly stunning, and an ideal size to paste into things such as childrens' project books. The simplicity of the software makes it ideal for young children to use while facilities are provided for more sophisticated snatching at an advanced level. SHIFT+CTRL+E (for Epson) or I (for Integrex) and S (for small) or L (for large)

are the only key presses required in order to obtain a high quality dump.

Obtaining Arc screen prints is much more consistent and straightforward. Grabbing screens from the desktop environment is no problem whatsoever. *Paint* has a Get Screen facility which performs the task adequately. Simply click the Menu button over the *Paint* icon and select Get Screen. A window outline can then be placed anywhere on screen to mark out the area to be captured. The resulting sprite-icon can either be dragged into an application or directory viewer, or it can be dropped onto a printer driver icon if one is loaded.

However, not all Archimedes software is Risc OS compliant and this presents a problem, particularly for those programs that take total control of the screen as indeed many educational programs tend to do. A similar situation occurs when running BBC B software under the *64Host* emulator or via the Pres A3K7 system. In these cases 4Mation Educational Resources once again comes to the rescue with *Snippet*.

Snippet is concerned with the manipulation of Archimedes screens, and in line with Risc OS guidelines is able to export/import screen pictures and sprites to and from any other Risc OS application. It comprises two programs which can provide pictures for use in applications like 4Mation's own *Jigsaw*, *Jiglet*, or *Poster*, or in wordprocessors like *Phases 1*, *Pendown* and DTP and graphics programs. In a nutshell, *Snippet* is a screens workshop where a screen image can be frozen while a program is running, and any part of it saved to disc or printed immediately via Risc OS printer drivers.

Snippet is an Arc version of *Snatch* but far much more versatile than its Beeb predecessor. In addition to the freeze-and-capture feature of *Snippet* (the module), *Snippet* (the utility) offers full sprite manipulation and presentation facilities. Sprites may be displayed in a carousel, compressed for easy disc storage, have borders and/or captions added, and can be enlarged or scaled down for creating montages. Flipping, rotating, pixel and colour editing are also all possible, and even BBC B and Master 128 screens can be grabbed via the *65Host* application, and converted into equivalent Archimedes sprites. *Snippet* can be as simple as you like, but its powerful screen handling capabilities really marks it as an outstanding utility program for the Archimedes, superbly complementing a colour printer.

The quality you obtain from your colour printer is directly related to the Archimedes printer driver you use and, in the case of dot-matrix models, the resolution you choose to print at. I discussed the latter condition last month where I stated that the optimum colour/definition relationship is found at lower resolutions on ribbon-type printers. But what about the printer drivers? The standard Acorn drivers found on the applications discs are not necessarily the best available. Indeed a number of companies have produced improved drivers for about £15 which offer better quality along with a range of features. Improved drivers are available for all the printers discussed last month – Ace Computing produces high quality dumps for the Integrex and JX compatible printers, the Ace Computing colour driver for the Citizen range of printers fitted with colour upgrades can be obtained through Citizen (UK) Ltd, and Beebug produces a colour driver for nine/24-pin Star and Epson ribbon printers.

The Ace *PrinterIx* Colourjet printer driver has three significant improvements over the one issued by Acorn. It gives better colour matching in that it is generally lighter, a medium resolution dump which utilises the printer's capabilities better than the low (too little ink) or high (too much ink) resolution dumps and it does not feed at the start of print, something useful for roll paper.



PRINTING COLOUR – EVEN FROM ESM'S PODD

The *PrinterJx* driver from Ace is for all Epson-JX compatible printers, including the Star LC-10. It has been optimised to work with the LC-10. The order of printer ribbon changing is set up for this printer, and other printers may suffer as a consequence.

Beebug's *PrinterLC* driver supports the LC200/LC10 and JX compatible printers, the LC and XB 24-10 models and the NEC Pinwriter. This is a truly comprehensive driver offering extensive control over the printing process. Graphics printing can be speeded up by using the monochrome option although this does stop sprites and fonts from being reproduced as halftones. There is also a new option on the printer driver in addition to Serial, Parallel, Econet and File. This is for NFS printing, for use with the TCP/IP suite available from Acorn. The quality that can be obtained from this driver has to be seen to be believed.

That's it for this month. I hope this has inspired you to go a step further with your colour printer and if you are still a novice, don't despair. Using the printer may look complicated to start with but if you take it slowly and don't try to be too ambitious too soon you will find that, for both you and your pupils, a good colour print attracts more attention from its intended audience, and is more rewarding for the creator, than the best of monochrome printing.

PRODUCT DETAILS

Colour Screenprint for the BBC B, Master 128 and Compact costs £35.Contact ESM, Duke Street, Wisbech, Cambridge PE13 2AE.

Snatch for the BBC B/Master 128 costs £29.50, and Snippet for the A3000/Archimedes costs £29. Contact 4Mation Educational Resources, Linden Lea, Rock Park, Barnstaple Devon EX32 9AQ. The price of Snatch includes the disc plus 16K sideways Ram.

The PrinterLC driver costs £15. Contact Beebug, 117 Hatfield Road, St Albans AL1 4JS.

The Ace printer drivers cost £15. Contact Ace Computing, 27 Victoria Road, Cambridge CB3 3BW.

The Citizen printer drivers for the A3000/Archimedes cost £12. Contact Citizen Europe Ltd, Wellington House, 4/10 Cowley Road, Uxbridge, Middlesex UB8 2XW

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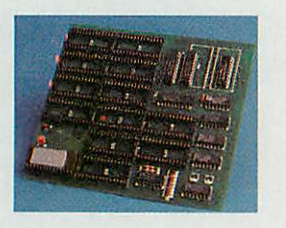
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In our A3000 First Steps series we have shown you how to use the desktop and the applications supplied with your machine. But the desktop isn't the end of the story as far as software is concerned.

You may have noticed modules mentioned at one stage or another. A module is a piece of software that has a specific purpose – for instance, there is one to control sound, one to read the keyboard as you type and one to control the desktop. These modules are resident in the and most powerful version.

One of the useful ways to learn about using Basic 5 is to type in the program listings in our yellow pages. There are two ways of transferring a program featured in *BBC Acorn User* onto your machine – either load it from the monthly disc (which is free to all subscribers, see page 27) or type in the listings from the yellow pages. Loading from the disc is fast and convenient, but does not teach you much about programming. So here we show you how to type one in.

BACK TO BASIC

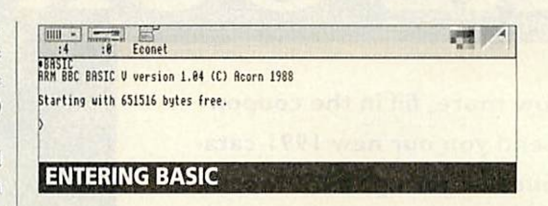
Our First Steps series ends with some programming advice and a look at Basic

Rom (Read Only Memory) of your machine. There are, of course, many more than the three listed here – type modules (or M. for short) at the command line (which you press F12 to access) for a complete list.

The Rom of your machine cannot be changed and when you turn off it doesn't lose what is in it. Storing the modules on a computer chip means that they are in place when you switch on – far more convenient and quicker than loading them all from a disc each time. However, some of the modules you need to run applications are not in the Rom and have to be loaded when you run an application, hence the need for the System directory.

The BBC A3000 has its own powerful language already supplied, hidden away as one of the Rom modules, called BBC Basic. Supplied with all Acorn machines in various forms, it is widely recognised as being one of the best implementations of the Basic language, and the version supplied with the A3000 – Basic 5 – is the latest





ENTERING BASIC

```
>AUTO
   10REM Program to print Hello
   20REM by Me
   30REM for all machines
   40REM (C) BAU August 1991
   50:
   60PRINT "Hello"
   70END
   80
Escape
>
```
YOUR FIRST PROGRAM

Press F12 to access the command line and type Basic. This tells the Basic language module to take over the machine and it in turn tells you, and then shows its prompt (a '>').

At some stage, you will want to save your program to disc, so format a blank disc and label it Programs. The formatting of the disc can be done with a star command from Basic. Type *FORMAT 0 E, then press RETURN. The star is there to tell Basic not to execute this command but pass it to the Command line interpreter (another module) which will then call the relevant routine to format the disc and then pass control back to Basic. This is exactly what happens when you choose Format from the desktop menu, except in that case you don't have to type anything and control is passed back to the desktop.

You can also name the disc, just like you can

If you haven't seen Longman Logotron's 1991 catalogue, chances are you aren't making the most of your school's software budget. Consider these brand new programs for the Acorn Archimedes:

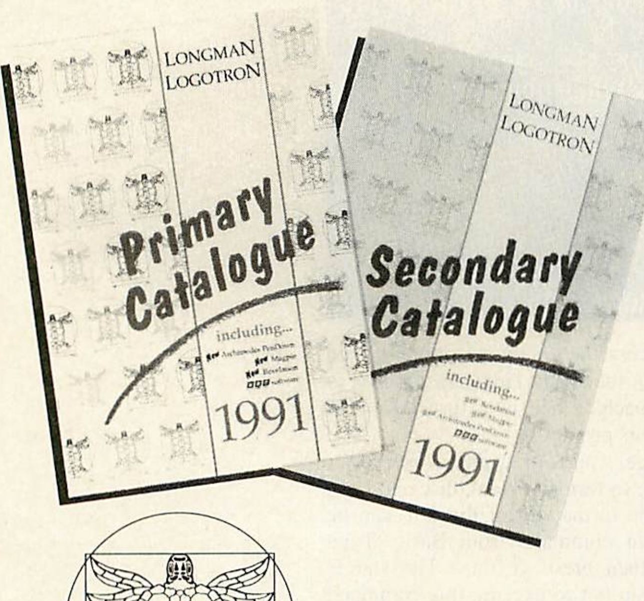
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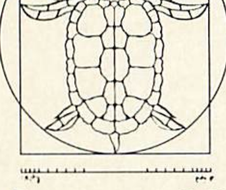


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from the desktop with the command *Namedisc followed by the name you've chosen. Don't forget to press RETURN after you've typed the command, which can be upper or lower case letters, or a mixture of both. Also, when typing in commands there generally needs to be a space directly after the command itself.

Below is a program listing similar to those seen in the yellow pages:

```
10 REM Program to print Hello
20 REM by Me
30 REM for all machines
40 REM (C) BAU August 1991
50 :
60 PRINT "Hello"
70 END
```

To start your programming session, first change the screen mode to 12 by typing MODE 12, then pressing RETURN, type AUTO, and press RETURN again. AUTO and MODE have to be in capitals as they are Basic instructions. The AUTO instruction tells Basic to commence with automatic line numbering, as you can see by your screen. The 10 is the line number. Basic stores programs as sequential lists of these numbers followed by the instructions on that line.

Another handy hint when typing in programs. Because of their nature, for all mixed capitals, use SHIFT CAPS. Hold down SHIFT and press and release CAPS LOCK. Now when you type the keyboard will generate upper case letters. Holding down SHIFT will produce lower case letters. You can configure your machine to start up this way by typing *CONFIGURE SHCAPS.

After the 10 that the computer prints on the screen, type the first line, do not type the 10 again. Don't type in any extra spaces at the beginning of the line either. The first line is preceded by REM (REMark). This is a Basic command, which tells Basic to ignore the rest of the line and carry on interpreting the next one.

All *BAU* program listings have this series of REMs on the first few lines: one to explain what the program does, one to say who the author is, one to tell you which machines it works with, and one with a copyright line and date.

Each time you press RETURN another line number is put up on the screen. By default these line numbers go up in steps of 10 – if they went up in steps of one, it would be impossible to put a new line in without deleting another one.

Line 50 has a colon on it, which is also ignored by the computer and is just used to break up the program to make it look better, and to make it easier to type in.

Line 60 is the real meat of the program and contains the monumental instruction PRINT, which tells Basic to print on the screen whatever is in the quote marks that follow it – in this case, it is Hello. Line 70 has a single instruction on it, END is used to tell Basic that this is the end of the program and to return control to you.

After you've typed END and pressed RETURN, press ESCAPE to exit the automatic line numbering and type LIST, which is the instruction to tell Basic to list the program lines it has in memory. And there is your program. To tell Basic to execute the program type RUN. Basic will then step through each line, translate it to machine code, pass it to the central processing unit which executes the code, and return control to Basic, which will translate the next line. This continues until the END command is reached. The result of all this is that Hello is printed.

Type LIST 60 and line 60 will appear on the screen. Press the up arrow key and the cursor will split into two. Place the small line under the 6 and press COPY, which is just above the up arrow. Basic will copy the character under the copy cursor and place it where the larger block is, just as if you'd typed it.

Keep copying the line until the first quote mark is copied, now type GOODBYE" then RETURN. Now if you list your program you will see that the line has changed, and running it will print Goodbye.

If you do type in programs from the yellow pages and you make any mistakes, the cursor and copy keys are your tools to fix them (there are easier ways, but that's another story).

Many of you will have taken advantage of our recent offer of free monthly discs with your one year subscription (see page 27). This has all the programs featured each issue, already typed in for you to use. You simply put the disc in the disc drive, go into the relevant folder and double-click on the program you want.

In the case of this month's disc, this is fine for programs like *Trees* in the *INFO section, which will run straight away. But for the scrolling routine it is more of a problem.

You need to run the *Makefont* program first which will save some data to disc. As the disc arrives write-protected, this will cause an error – to use many of the programs on the monthly disc it is best to transfer them to another disc and run them from there, from Basic, not the desktop, as instructed above.

Listed here are some commands that will help you find your way around the monthly disc while in Basic:

*CAT Catalogue the current directory
*DIR <directory name> Go into a directory
*UP Move up a directory level
LOAD"<fname>" – where <fname> is the name of the program you wish to load
CHAIN"<fname>" This is the same as typing LOAD"<fname>", then RUN, or double-click on the program in the desktop.

Paul James



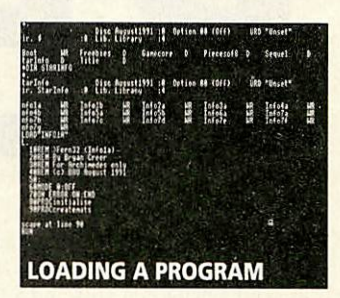
TYPE RUN TO EXECUTE



USE CURSOR KEYS TO EDIT



RUN THE NEW VERSION



LOADING A PROGRAM

COMPETITION

We have five copies of the BBC Basic User guide for the Archimedes to give away this month, they'll go to the five people to tell us the most interesting idea for a program. Send your entries to BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ. Mark your entry 'First Steps Competition'.

Last month I introduced you to *GameCore*, a relocatable module that takes the hard work out of writing software to play strategic games, such as draughts, reversi or chess. You simply provide the specific routines to play a move, describe the board, and so on, and the *GameCore* module does the rest.

GameCore was written with the desktop environment ultimately in mind. The single-tasking demonstration version I supplied last month is very similiar to the multi-tasking version in this month's yellow pages. *GameCore* thinks in 'slices' and thus can easily be used to play games while other applications are running alongside. Indeed, as you will see, it can even play several games at the same time. Unfortunely, the program is too long to fit in the yellow pages. However, it can be found on the monthly disc (see pages 27 and 81 for details).

since they cannot be flipped by your opponent. Squares next to the corners are often dangerous and should be avoided. Placing a piece of yours next to a corner will (unless you are particularly lucky or clever) often lead to the opponent capturing that corner.

GAME OPTIONS

Take a look at the control window. At the top are two columns of icons, one for each player and the icons Player 1 and Player 2 are selected according to whose turn it is. You may click on either to force it to be a certain player's turn. Below these are indicated the types of players – click on these to select Human or Computer. Next down is the time per move, which limits the time (in minutes and seconds) that the computer may have to make its move. This is an average time, so occasionally the machine will sometimes take a few more seconds to come up with a good move (for example, towards the start of a game of 3D noughts and crosses). As soon as possible, though, the time taken will be limited to that given in the box. The default is three seconds, although this is 'real' time – if you have three games going at once, the computer will only spend one second per game, so bear this in mind when setting time limits.

Under the times are icons peculiar to each game. 3D noughts and crosses does not use them, but the number of black and white pieces are shown here when playing reversi. Further down are icons showing games won by each player, followed by an information box, which gives messages like 'Thinking...' and 'Your move...'

The currently selected game is shown at the bottom of the control window and you can cycle through those in progress using the arrow keys. Note that although you can only alter things like 'time per move' for the game currently shown in the control window, clicking on all game windows is possible, so you can truly play up to eight games simultaneously.

Bringing up a menu over a game window provides various options. New Game resets the board – pause is self-evident, but may be activated automatically. The Skip submenu allows you to retract or re-make moves, while the last two options are used to display the control window and provide lists of possible moves respectively. This latter feature is implemented

GOING INTO REVERSI

ADAM BROGES

follows up last month's GameCore program with advice on playing multiple games

To start a new game, bring up the menu over the *GameCore* icon and go off to the New Game submenu, where you will find a list of the games detected by the application. You should have a choice of two. Click on the desired game and two windows (a game window and the control window) will appear. You can open up to eight game windows, four playing 3D noughts and crosses and four more playing reversi, if you wish. There is only one control window which is used to alter various parameters for each of the games in progress. Closing any game window will kill off that game.

To make a move in a game simply click where appropriate on the window. 3D noughts and crosses behaves exactly as before. To make a move in reversi click on a valid square.

PLAYING REVERSI

The idea of reversi is to sandwich opposing pieces between those of your own colour – horizontally, vertically or diagonally. Pieces sandwiched in this way can be flipped over and converted to your colour. When the board is full, or no more flipping can take place, the winner is declared to be the person (or machine) with most pieces left on the board. You can only lay pieces that flip at least one opposing piece – if you cannot move, your opponent simply takes another turn. The first four pieces must be placed in the centre.

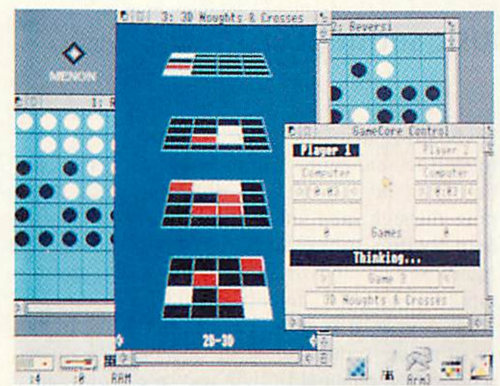
Edge squares and, better still, corner squares are valuable to capture, particularly the latter

for reversi, but not for 3D noughts and crosses (where it would be of no use.)

There is little space here in which to explain how it all works, but here though is a brief outline. Each new game is created with PROCopengame, which produces a set of variables, tables and a '*GameCore* instantiation' peculiar to that game. Each game in progress is processed in turn during the 'null' Wimp event – having a separate set of variables (and a separate status flag) for each game makes this possible.

The various states of the status flag are the same as in the single-tasking version last month (with one addition for when a game is paused or over). The idea is that a computer or player move is processed in small steps during periods of time when the Wimp is not busy.

As each little step is completed, the status flag moves on to the next. Altering parameters (like switching from Human to Computer) causes the



PLAY UP TO EIGHT GAMES AT ONCE

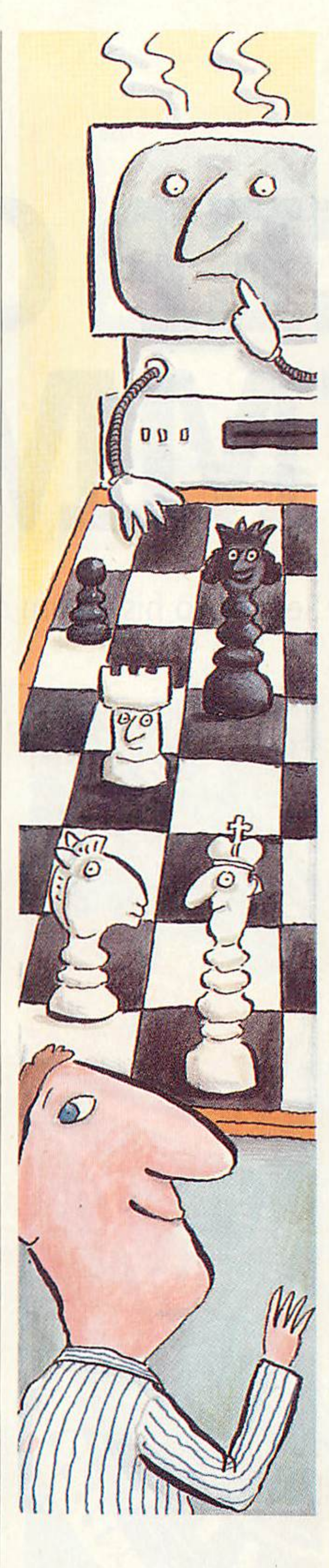
status to be reset. In this way the program doesn't get confused by the user changing things at the wrong moment.

Like last month's demonstration, each new game consists of a library of functions prefixed with a unique two letter abbreviation. You can have more than one library – there are TD_Lib and TD_Lib2 in this month's version. All valid libraries are installed at the start and must be placed in the GameCore directory and have names of the form XX_Lib, XX_Lib2, etc.

Functions must be provided to deal with computer/human movement, board display and many miscellaneous functions. Each game library should contain an initialisation routine which sets up a block of memory describing the game which is returned (filled in with any other details necessary at the time) to every function called. So, for example, when the board needs to be redisplayed, the function FNtd_showboard or FNrv_showboard is called, supplied with the address of the original info block describing the game. Figure 1 shows the contents of a *GameCore* information block.

Many of the parameters will not mean anything unless you have studied the program, but I include it to show the sort of information required to define a game (and which must be passed on to the individual game routines).

Each board is drawn 'in' its own sprite. Risc OS makes it easy to redirect VDU output to a sprite and it is almost simplicity itself to plot a single sprite per game on the desktop display. Every time a game library function is called (via FNfunc) a check is made to see if that function altered the board.

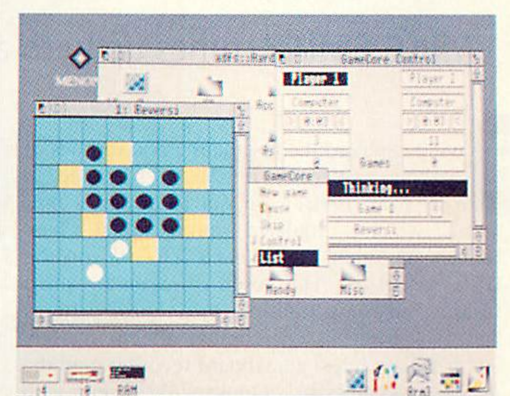


If so, the appropriate area (and no more) is replotted, which keeps overheads to a minimum.

The algorithm used to play reversi is quite simple. Weight is clearly given to the number of counters turned over, but perhaps more importantly, a map of the board is maintained which is used to give particular weight to certain squares. For example, at the start of a game the corners are rated highly and should be captured at all costs. As other squares are captured, values may change and so the map is 'dynamic', altering its weights as the game progresses.

CREDIT ERROR

Last month we mistakenly credited Dave Acton for the GameCore program. We apologise to Adam Broges for this error.



PIT YOUR WIT AGAINST THE ARC

FIGURE 1

Offset	Contents
0	Address of board
4	Address of 'make a move' routine
8	Address of 'unmake a move' routine
12	Address of 'initialise list moves' routine
16	Address of 'list a possible move' routine
20	Lookahead depth 1
21	Lookahead depth 2
22	Lookahead mask
23	Reserved
24	Absolute max permissible search depth
25	Flags determining action if player(s) can't move
26-27	Reserved
28	Address of 'stalemate' routine
32	X-size of board sprite
36	Y-size of board sprite
40	Board size (in bytes)
44	Address of private stack
48	Address of move list
52-53	Preliminary search depths
54	Difference between full and lookahead depths
55	Length of move (in bytes)
56	Address of 'best' move
60	Player to move
61	Stalemate counter
62-63	Reserved
64-75	Mouse position, button state
76	GameCore module instantiation number
80-127	Reseverved/used by individual games

KEEP ON STRUMMING

MIKE SMITH comes up with a Sequel to his Strum music sequencer for the Beeb

Having explored the fascinating possibilities of rhythmic patterns with *Strum* (featured in *BAU* May 1990) I set out to design a program which emulated professional bass sequencers, such as Roland's TB-303, on the BBC model B. The result is *Sequel*, which features not only multiple bass lines, patterns and tracks, but also percussion effects, melody and harmony lines, a keyboard recorder, and the means to synthesise sounds while listening to the effect.

Any patterns, tracks, keyboard sequences or instruments created can be saved to, or loaded from, disc. The program runs in mode 7 on any BBC micro, provided PAGE is at &1300 or less. Up to 10 complete songs, or tracks, can be recorded and stored on the function keys, plus SHIFT. Tracks consist of up to 64 sequences, or patterns, which can also be stored as up to nine presets on the function keys.

The patterns, each with up to 16 beats, can be recorded in step or real time using the micro's two-octave keyboard on a matrix of four channels using percussion, or three with bass. They can be combined to create bars of any number of beats, rests can be included and notes can be of any duration, accented as required.

While recording or playing back the patterns or tracks, various parameters – such as tempo, beats per bar, duration of note, volume and transposition – can be changed. Also, an envelope editor can be used to sythesise any instrument, using 'additive synthesis' if required by simply recording the same note on the same beat on different channels.

Notes can be entered, or parameters changed, without playing the sounds if required. The range of the editor has been extended to include and vary all of the percussion effects (drums, cymbal and brush), and the bass sound, which uses two channels for different parts of the envelope (channel 0 for attack and decay, channel 1 for pitch).

A 1064-note keyboard player and recorder, which uses one of the available channels, is also included. Notes are entered from the two-octave keyboard (c at TAB to B at _ ; c# at 1 to A# at \), in step or real time. The recorded sequence can be edited on playback by punching-in or stepping through, and short loops can be set up to help with tricky bits. The keyboard is 'quantised' to the rhythm tracks, which can be turned on or off channel by channel.

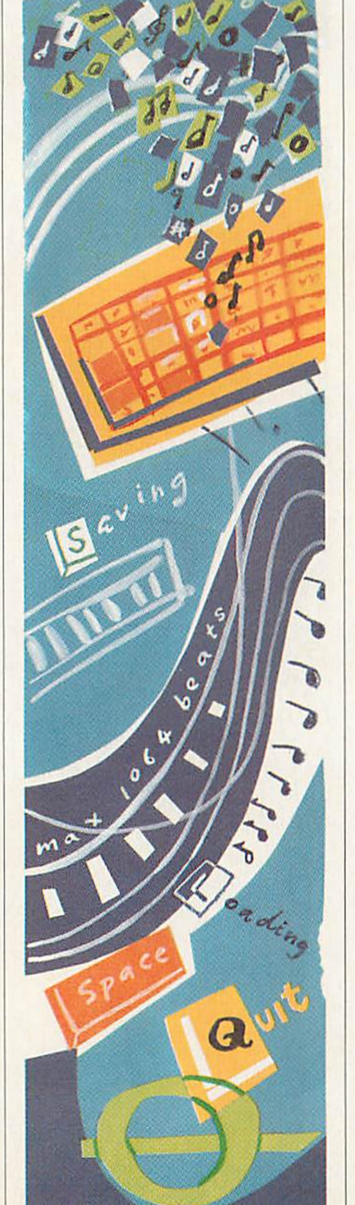


Illustration by Sarah McMenemy

Of course, it is quite easy to record a simple metronome sequence, with accented beats as required on channel 0, then record a more complex rhythm and accompaniment track over.

The program starts from a main menu. Pressing ESCAPE at any time in other modes returns to the menu and sets sequences back to the start. Below the menu is a reminder of the effect of the function keys – preset patterns, recorded tracks, channel on/off, and preset instruments, using SHIFT and CONTROL as appropriate. The default instruments can be restored by pressing I. Loading from or saving to disc can be affected by pressing L or S. Pressing Q quits the program, leaving you in mode 7 with normal editing and cursor control.

SEQUENCE MATRIX

Pressing B for bass or D for drum enters the main sequence recording matrix, initially on pattern 1, with 16 beats per bar, and in step time. Any notes already recorded are displayed on a matrix of three or four channels, with the current channel highlighted. The current beat to be edited is highlighted with a red cursor bar, which can be moved with the left or right cursor keys. The current channel can be changed with the up and down cursor keys.

Notes are recorded from the keyboard as above, transposing by octaves with D,H (extending the range of the keyboard by an additional three octaves), percussion hits with H,M,L,D,C or B for high, medium or low snare drum, bass drum, cymbal or brush, tied notes with / and rests with : . Pressing SPACE starts or stops the sequence playing, but you can enter notes or alter parameters at any time. Pressing F8 plus CTRL puts the sequencer into real time and you enter the notes or hits as the sequence is playing

with immediate effect, extending notes by keeping the key pressed down, as on a normal keyboard.

Any of the preset patterns one to nine can be recorded or edited by pressing its function key. COPY plus SHIFT allows patterns to be copied – useful when setting up complex tracks with variations on a common theme.

Pressing function key 0 plays back the current track sequence of Patterns (initially set to repeat Pattern 1). Notes cannot be entered in track mode, but the whole sequence can be transposed with the keyboard to change key. Tracks 0 to nine are accessed with function keys plus SHIFT.

ENVELOPE EDITOR

Pressing COPY enters or returns from the Envelope editor, a powerful mode which enables you to hear the effect of any change of the envelope parameters instantly. The up and down cursor keys are used to move to a particular parameter – the left and right keys to alter its value in steps of one, or 10 with SHIFT. The original values are displayed for reference and the new value highlighted.

Note that the overall duration on each channel is controlled from the sequencer matrix and interacts with the length of a note, the current tempo, and the envelope shape.

It should be set to -1 (or 255) for indeterminate note lengths, such as organ sounds, or long decaying instruments like vibes, or for shorter staccato effects.

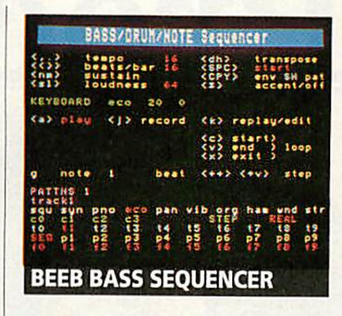
A new instrument can be accessed within the editor by pressing a function key plus SHIFT and CONTROL. You first have the opportunity of renaming it or pressing return to continue.

Note that channels can have different instruments, accessed at any time, thus allowing multi-voice counterpoint, syncopated rhythms, 'additive synthesis' or chord harmonies.

TRACK EDITOR

Pressing T from the main menu enters the Track editor, initially on Track 0. Any other track can be accessed with function keys 0 to nine plus SHIFT and patterns already recorded will be displayed. The left and right cursor keys are used to move to a pattern number, a new one can be entered by pressing one to nine, a copy inserted with COPY, or a pattern deleted with DELETE. The cursor will advance automatically at the end of the sequence.

Any number of patterns up to 64 can be entered into the program, each one up to 16



BEEB BASS SEQUENCER



SYNTHESISE SOUNDS

beats long, giving a maximum of 1064 beats – the same as the keyboard recorder.

Pressing K from the main menu accesses the Keyboard mode, which has a slightly different matrix display. Again, the overall parameters can be changed, including the Instrument envelope.

The keyboard can be played unquantised with the sequencer stopped, or quantised with the sequencer playing, channels on or off. You can record or playback/edit quantised with the sequencer on, or enter and edit notes in step time with the sequencer off.

In the latter case, the actual note being recorded or edited is shown with its musical value and beat number, stepping through with the left and right cursor keys. Remember / to extend a note and : for a rest.

Notes can be altered either by stepping through the sequence, punching-in as the sequence is playing back, or in a short loop, started by C, V to end, and X to exit. The keyboard range can be altered by octave transpositions, but it remains two octaves.

It is possible to load or save to disc any tracks, patterns, or instruments, as stored on the preset function keys, or keyboard recordings. A file name is asked for and you are told if a file is not on disc or already present.

Prefixes should not be used, as the program automatically supplies them – star commands can be used here to change drive or catalogue the disc.

HOW THE PROGRAM WORKS

There are two main loops: PROCplay, which determines the current pattern in the track sequence, pat?(T%*64+p%); and PROCbar, which determines what note to play on each beat via PROCnote, PROCbass and PROCdrum from the arrays, pitch%(pat%,b%,c%) for pitch, and env%(pat%,b%,c%) for accent. The loops are timed by using the System variable TIME (=tempo%), giving control to 1/100sec, rather than the 1/20sec possible with the duration parameter in the SOUND command.

The keyboard is checked on every cycle with PROCpar(INKEY(0)), and appropriate action taken to alter parameters, play or record a sequence or a keyboard note, or change an instrument parameter with PROCvaryenv.

Note the use of INKEY(-L%) in PROCrealtime and PROCkeyboard to check if a key is still being pressed, thus extending or ending the note.

The New Generation of Word Processors

Word processing is evolving from the traditional character based word processors of the past to the new graphical based word processors of today. Even on PCs this evolution is evident with the release of new graphic based word processing products that run under Windows 3 from the largest software houses Microsoft, Wordstar and Lotus.

The new generation of word processors all have certain features in common. They all allow free use of different text sizes and styles. They all offer a range of graphic manipulating tools and, of course, they all operate under a windowing environment.

While most PC users are only just coming to grips with the new style of word processing, Archimedes owners have been able to word processes like this for 18 months With the introduction of Impression. Archimedes owners have had the use of features like a good WIMP environment and outline fonts (long before the PC world caught on). And today the machine still offers features such as inter-application data transfer and font anti-aliasing that no other mainstream system can provide, ensuring that the Archimedes architecture will continue to lead the way. Quite simply, on the Archimedes, you get tomorrows PC architecture today.

This image (an old engraving of Charles Dickens) was captured using Scan-Light Junior at 400 dpi. This scanner is ideal for black and white line-art or pictures such as this.

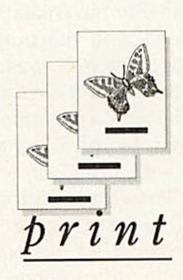
With the release of the new greyscale scanner, Computer Concepts can now supply all the components for Archimedes owners to put together the ultimate word processing system. Our hardware and software products support all three stages of document production, from capturing pictures, through word processing and document creation to printing.



create



capture



print

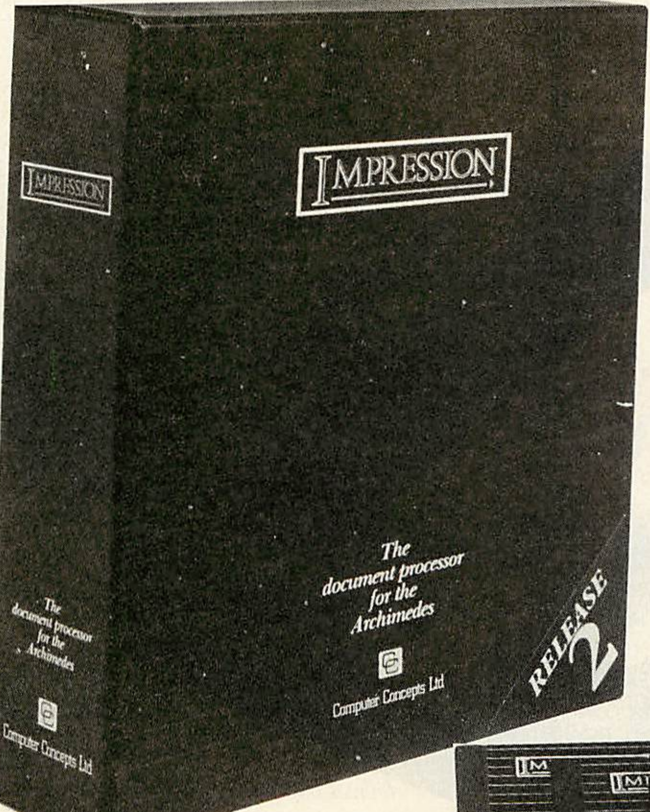
IMPRESSION II



create

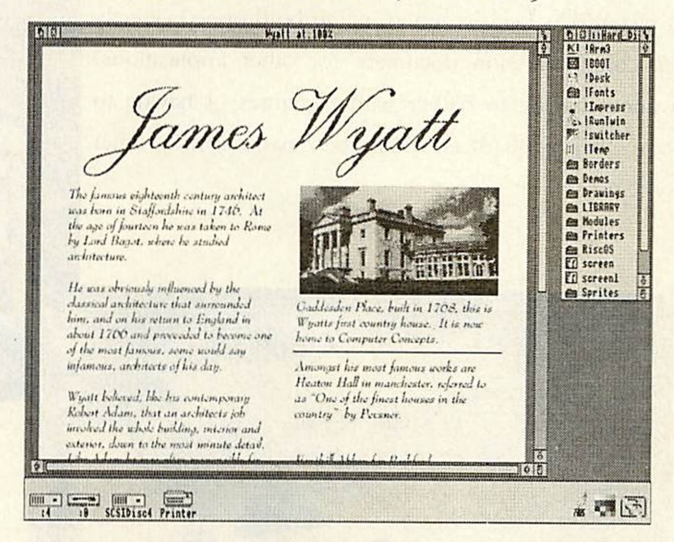


The key part of any system is the word processor. With over 10,000 users (not including the hundreds of educational site-licences installed) Impression Junior and Impression II have become an industry standard for the Archimedes, and it is still growing in popularity. It is probably no co-incidence that the new word processors for other machines are adopting many Impression-like features since it is only logical that, as machines become more powerful, they begin to integrate desk-top-publishing facilities with traditional word processing. Impression is simply the most efficient, compact, fastest product in its class, able to handle the simplest word processing jobs as well as the most complex desk-top-publishing work. It is the only word processor designed to print using either the native character mode of the printer (ideal for text only word processing and dot matrix printers) or using the RISC OS printer drivers for top quality, full page graphics and text. Imagine the freedom of near typeset quality type - any face, any size, any position on the page, with the ability to place diagrams or pictures wherever desired. Impression offers that freedom - perhaps the ultimate evolution of the word processor.



Impression Junior offers all the key Impression features. Built-in SpellMaster spelling checker, full word processing and DTP abilities, outline fancy font and character font editing, full RISC OS compatibility drives RISC OS printer drivers. It is a small compact program ideally suited for the smaller machine.

Impression Junior £89.95+VAT (£105.69 inc)



What you see on screen is always an exact representation of the final printed page, including fonts, columns and graphics.

$$J_n(x) = \frac{x^n}{2^n n!} \sum_{s=0}^{\infty} \frac{1}{s!(n+1)^s} \left(-\frac{1}{4}x^2\right)^s$$

If your word processing requirements include any equations or formulae then our Equasor product integrates with Impression to allow equations to be built up graphically, then just dropped into the Impression document where required.

Impression II is able to handle longer or more complex documents. Enhanced DTP abilities such as instant graphic rotation to any angle, Drawfile frame borders, and guide frames. It also offers unique features for long word processed documents such as contents and index generation, unlimited document length (not RAM limited), styles, in-line graphics etc.

Impression II £169+VAT (£198.57 inc)

capture

While the Archimedes is powerful enough and flexible enough to handle graphics with supreme ease, this is only useful if it is equally easy to input graphics. The Scan-Light family of image scanners offers a range of capabilities and prices to suit all requirements.

There are three members of the Scan-Light family of image scanners. They are supplied with interface board and simple-to-use software. (Versions are available to fit internally in the A3000). And thanks to direct data exchange, once a picture has been scanned, it can be dropped directly into an Impression document (or other applications) without having to bother with filenames or having to save, then re-load as would be necessary in other systems.

The Scan-Light software includes many unique features such as instant rotation of the scanned image to any angle, image sampling to produce true grey-level images from black and white scanners, full grey-map control to alter contrast brightness etc. Over the last 18 months the Scan-Light series has become the most popular available with all types of users - home users, professional, and educational.



This image was captured from a print using the new greyscale Scan-Light Junior 256. This is able to capture, display and reproduce stunning quality half-tone photograhs, although it can also scan black and white images at up to 400 dpi.

Scan-Light A4 will scan complete A4 pages, up to 400 dpi. It is shown here fitted to its optional sheet feeder. If installed with a LaserDirect printer, the software offers a quick scan-and-print photocopy facility.

Scan-Light A4 £399 +VAT (£468.82 inc)
With sheet feeder £499 +VAT (£586.32 inc)

Scan-Light Junior and Junior 256 are hand-held devices capable of capturing images up to 105mm wide (4.1inches).

Scan-Light Junior mono.. £189+VAT (£220.07 inc)
Scan-Light Junior 256 . . . £220+VAT (£258.50 inc)

print

Once the pictures and text have been processed and arranged as required, you need to be able to print them to the highest possible quality in the shortest possible time. Laser printers provide the quality but have traditionally been slow and expensive. The LaserDirect range of printers offers not only the highest quality printing available (to 600 dpi) but also offers by far the fastest printing available on the Archimedes and at a lower cost than traditional lasers.



LaserDirect Qume. 6 pages per minute 300 dpi. (2Mbyte machine required.)

LaserDirect Qume £999+VAT (£1173.82 inc. Postage extra)

Direct drive laser printers are not a new idea. Apple Mac users have been able to buy direct drive printers for their computers for some time, but while these printers are low cost, they have the reputation of being slow. Here again Archimedes owners win because their machines have the necessary processing power to eliminate the speed problem, and the operating system facilities (such as outline fonts) to ensure that what you see on screen is really exactly what you will get on the printed page. LaserDirect printers offer print speeds of 5 to 10 times that of a typical LaserJet, at a lower cost and can also offer 600 dpi printing for a third of the cost of such printers for other machines. Indeed, so significant have been the benefits, direct drive lasers have now all but eliminated traditional laser printers from the Archimedes market, with the LaserDirect range being the most popular laser printers with Archimedes owners.

Integrated solutions

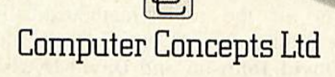
By using the Computer Concepts software and hardware products with the advanced technology of the Archimedes it is possible to create what must surely be the ultimate word and document processing system. A system that allows high quality half-tone pictures to be captured and incorporated into documents, that integrates word processing and desk-top-publishing and, finally, outputs top quality laser printed pages.

All Computer Concepts products are available direct from Computer Concepts or from all reputable dealers. More detailed brochures are available for most of our products.

LaserDirect HiRes. 8 pages per minute and 300 or 600 dpi. (4Mbytes recommended for 600 dpi.)

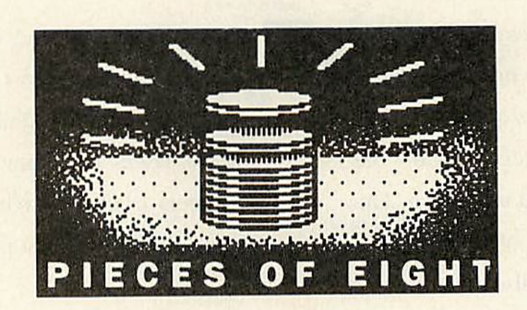
LaserDirect HiRes8 £1495+VAT (£1756.62 inc. Postage extra)





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Educational discounts available



CARRY ON SCREAMING

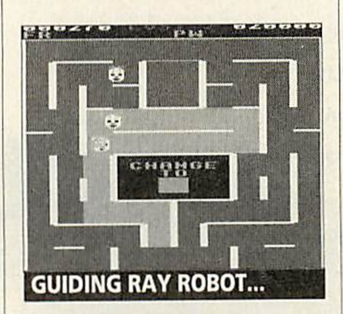
PAUL JAMES plunders our archives and unearths a classic arcade puzzler and something creepy crawly

This month we have dug up a classic arcade puzzler to keep you eight-bit owners screaming at your screen. **Dave Acton's** *Spectramania* was first published in *BBC Acorn User* in January 1986, and now it's back to torment you!

Spectramania is a fast arcade-style game set in the colourful and ever changing Spectramaze. The task is to guide Ray Robot (who admittedly does look like a paint roller) around the maze, changing the colour of the blocks as you go. Controlling Ray is simple, just use the Z, X and / keys to guide him up, right, left and down.

To make life difficult, David introduced the Smiffs who relentlessly chase you down and take a life away if they catch you. Some help is provided for Ray – catching an AU pill freezes the Smiffs where they stand, giving you vital seconds to splash paint on a hard to reach corner. The Power pill gives you the ability to munch on the Smiffs, gaining bonus points, but the reprieve doesn't last long, and these guys have replacements. A bar at the top of the screen tells you how long you have before either pill loses its potency, and the chase resumes, with Ray as the prey.

The game has five levels of difficulty. Level one is completed when all of the blocks have changed colour. Having progressed four rounds at this level you reach level two, where you have to change the colour of the blocks, then change them back again. Level three presents yet more of a problem in that you have to change all the blocks, but treading on one that has been changed will turn it back again. Dave obviously thought this level was possible because level four exists, in which you have to change the colour of each block twice, but stepping on a changed block changes it back to the second colour in the sequence. Level five has three colour changes and stepping on a changed block reverts it to the first colour. A bit difficult to do, but I suppose one of you out there will do it.



GUIDING RAY ROBOT...



...WITH THE SMIFFS CHASING

Some of the more special features of the game are rather interesting, especially the way Ray and the Smiffs glide effortlessly over the blocks. Dave acheived this using two-plane graphics – each pixel is represented by four bits, two of which are used for the foreground colour, and two for the background colour.

How are the Smiffs controlled? Well, David opted for simplicity here. A Smiff tries to home in on you horizontally, and then vertically. If it still hasn't got you then it wanders around for a while, following invisible arrows on the maze for a random number of blocks, then tries catching you again. Using the invisible arrows means that they don't get stuck in corners and have some 'unpredictibility'.

There are three listings on the yellow pages and each one should be typed in and saved before being run. Save listing one as *Spec1*, listing two as *Spec2* and I'll leave you to guess what to call listing three. Then CHAINing *Spec1* should run the game – if not, it's up to you to find the error of your ways. There are checksums to help you through.

On a slightly higher level the second classic this month is for the more mathematically minded. First published in October 1986, the program by **David Johnson and David Deutsh** is an exceptional graph plotter. So what's so special about it?

Simpler curve plotters (don't forget we're

talking 1986 here) have three main drawbacks. First, they cannot plot some of the most interesting equations, such as X^2^Y=Y^2^X – ie, those which have X and Y on both sides of the equals sign. Such curves often require more than one Y value to be plotted for each value of X. Second, they do not deal with equations containing expressions such as 1/X or LN(SIN(X)), which cannot be evaluated at certain points. Third, they do not allow functions to be given in polar co-ordinates.

The *Spider* curve plotter overcomes all of these limitations, as the screenshots here illustrate. Equations can be expressed in any convenient form, with arbitrary expressions involving X and Y, or the polar co-ordinates r and t, or even mixtures of all four, on both sides of the equals sign.

For speed the program evaluates the function at as few points as possible in the plane. As soon as it has found a point at which the equation is satisfied it crawls along it, plotting the curve as it goes, just like a spider building a web, but with a little more mathematical awareness.

Once it has finished one branch of the curve it finds the next, and continues like this until the job is done.

Before using the full *Spider* program it may be useful to type in the *Solver* program, which illustrates how equations with one unknown can be entered by you and solved by the computer.

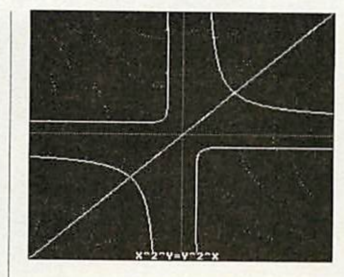
The technique used is first to input the equation, then replace the equals sign with a minus sign. So 2×X=X+3 would be turned into 2×X-X+3. This new equation can then be evaluated for a estimated value of X using EVAL – the Basic command which evaluates a string. The equation is continuously solved, each time improving the result, until it reaches a decimal number that is close to zero (how close is specified by you). Listing 4 on the yellow pages shows the Newtonian method in use.

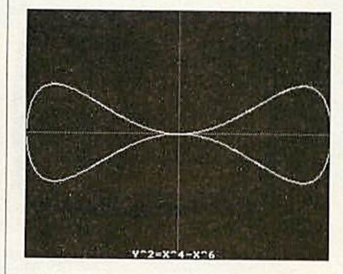
The program uses an ON ERROR GOTO trap, for when given an equation such as SQR(1-X^2)=0, which has the solution X=1, the method of solving it may involve the value in the brackets being a negative number, and this causes an error because there is no square for a negative number.

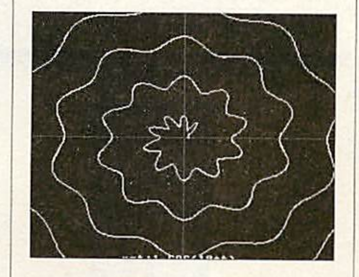
The trouble is, when an error occurs on a Beeb the Basic return stack is cleared, so this method cannot be used inside a procedure, function or GOSUB. This is the reason GOTO is used – a reasonable excuse, even if it does grate the teeth of the PROC fanatics.

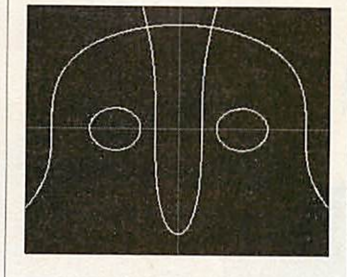
The *Spider* program itself draws the curve by using this method on both the x and y co-ordinates. It finds a solution to the given equation as a function of x and y (the guesses are plotted as red dots) then moves along the curve in short straight lines, each time correcting itself with Newtons method.

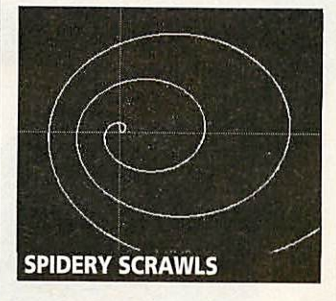
It isn't that simple, though. At first sight it might seem sufficient to evaluate the function at that point and see if it is less than zero (assumed to be about 0.000001). However, this is not good enough, since the function may get very small,











SPIDERY SCRAWLS

and never actually reach zero. The solution is to try four points around this point, and then it is a simple case of checking if one of these numbers is on the other side of zero, meaning that the curve will carry on in the direction it is going.

A second check is needed to test the rarer case of the function just touching zero, rather than passing through it. In this case, the condition is that the central point should be a factor of 100 smaller than the sum of the sizes of the other points.

The rest of the program works as follows. First the program asks you for the equation to be plotted – as with the first program, this equation is converted to a form which can be EVALued. The program then asks you for a range of values over which the equation should be plotted, effectively the window you view the curve through. The program inputs these values as strings, so you could, for instance, type SIN(PI/3) into here.

The program then checks for the presence or r or t, the polar co-ordinates, and if they are there it asks you for the range of values for t over which the equation should be plotted. Each 2×PI range corresponds to one full rotation around the plane – successive planes are plotted in sequence, counted by the variable sheet which counts from losheet to hisheet. Alternate sheets are plotted in two different colours.

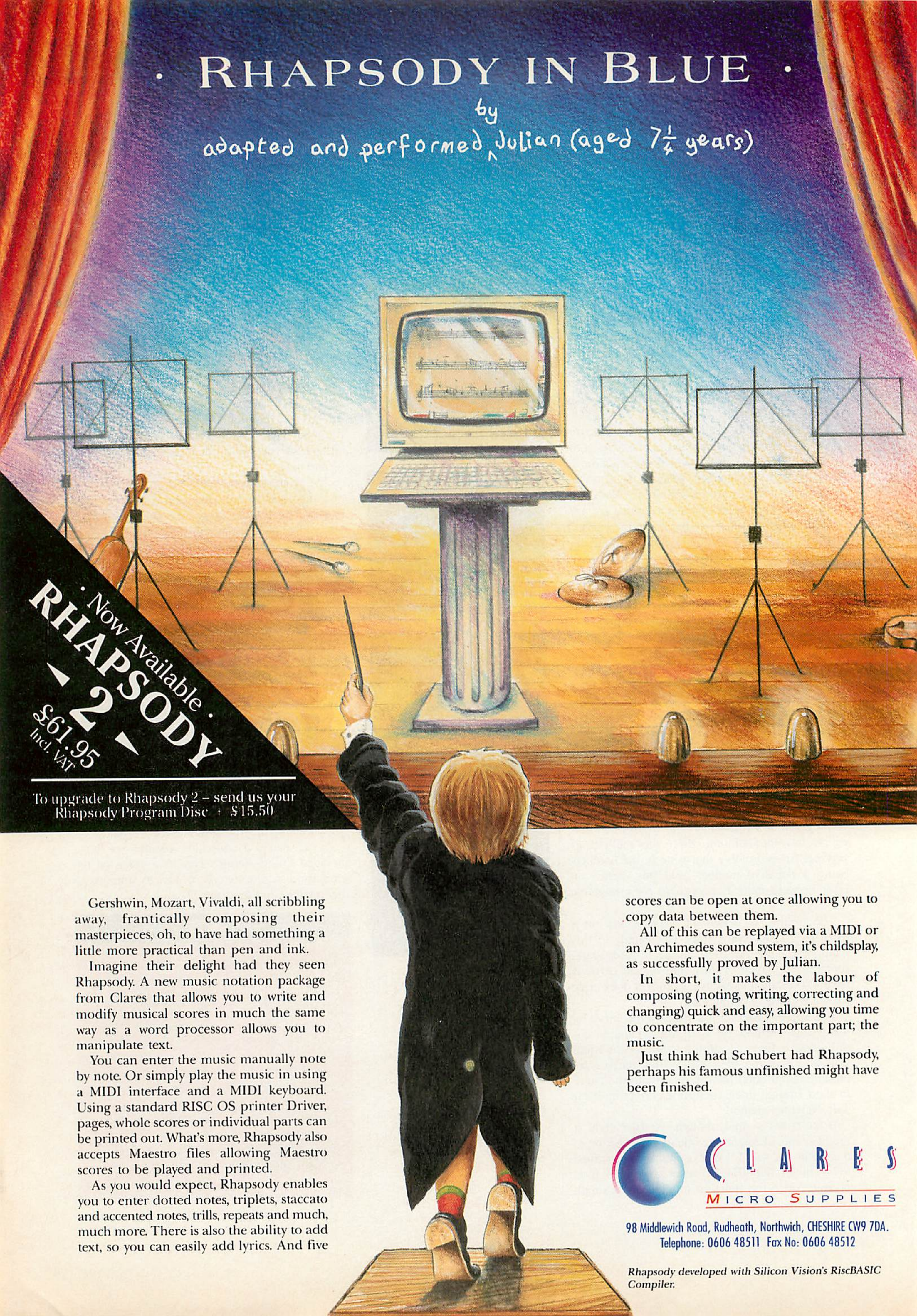
To save time when drawing the curve it is drawn in small straight line segments, rather than pixel by pixel. The arc variable holds the approximate amount of pixels in such a straight line segment. For faster plotting increase this value, but at the cost of courser curves.

When you have first typed the program David advises you to leave out the ON ERROR statements, and enter a well behaved formula such as Y=X^2 to show up any typing errors. When you are satisfied that the program is working correctly, then put all of the error traps in and try some of the equations from table 1 below, or enjoy making up your own curves.

As a special Bonus this month, we have included David Acton's *Quadline* game on the monthly disc. For details of how to subcribe to the monthly disc see page 27.

TABLE 1

Equation	X		Y		t
X^2^Y=Y^2^X	-8	8	-8	8	
Y^2=X^4-X^6	-1.1	1.1	-1.1	1.1	
(Y-SINX)×(X+SINY)=0	-2×PI	2×PI	-2×PI	2×PI	
Y=TAN(X)	-2×PI	2×PI	-10	10	
Y=LN(SIN(X^2))	-3	3	-3	1	
r=t	-10	10	-10	10	0
	4×PI				
r=t+1-COS(10×t)	-20	20	-20	20	0
	8×PI				
r=t+X/2	-15	30	-20	20	-4×PI
	4×PI				
(X^2-1)^2=Y^2×(3+2×Y)	-2	2	-2	2	
r=SIN(t+2×SIN(r+SINt))^2	-1.1	1.1	-1.1	1.1	0
	2×PI				



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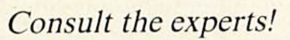
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***Info**	49											
Info 1a								■	■		■	■
Info 1b		■	■	■	■	■	■	■	■	■	■	■
Info 2a		■	■	■	■	■	■	■	■	■	■	■
Info 3a								■	■		■	■
Info 4a		■	■	■	■	■	■	■	■	■	■	■
Info 4b								■	■		■	■
Info 5a								■	■		■	■
Info 5b								■	■		■	■
Info 6a								■	■		■	■
Info 7a - 7c								■	■		■	■
Info 7d - 7g		■	■	■	■	■	■	■	■	■		■
Sequel	72											
Seq1		■	■	■	■		■			■		■
Pieces of 8 (1)	77											
Po81 - Po83		■	■	■	■	■	■	■	■	■	■	■
Po84 - Po85		■	■	■	■	■	■	■	■	■	■	■

Note (1) The Spectramania program will work under !65Host, the BBC emulator. Refer to the last of the yellow pages for more advice.

The Gamecore application is not listed on thos months yellow pages. However, it is on the Monthly disc, ready for you to play. Order details on page 27.

★Info

Listing 1

```
10 REM >Fern32 (Info1a)
20 REM By Bryan Creer
30 REM For Archimedes only
40 REM (c) BAU August 1991
50 :
60 MODE 0:OFF
70 ON ERROR ON:END
80 PROCinitialise
90 PROCcreatemats
100 REPEAT
110 rnd = RND(101)
120 CASE TRUE OF
130 WHEN rnd <= p1:
140 PROCtrans1
150 WHEN rnd > p1 AND rnd <= p2:
160 PROCtrans2
170 WHEN rnd > p2 AND rnd <= 100:
180 PROCtrans3
190 OTHERWISE:
200 PROCtrans4
210 ENDCASE
220 POINT point0(0) * 1024,point0(1) * 1024
230 UNTIL FALSE
240 END
250 :
260 DEF PROCtrans1
270 point0()=point0().transmat1()
280 ENDPROC
290 :
300 DEF PROCtrans2
310 point0()=point0().transmat2()
320 ENDPROC
330 :
340 DEF PROCtrans3
350 point0()=point0().transmat3()
360 ENDPROC
370 :
380 DEF PROCtrans4
390 point0(0)=0
400 point0(1)=RND(1)*stemlen
410 ENDPROC
420 :
430 DEF PROCinitialise
440 ORIGIN 640,0
450 COLOUR 1,0,240,0
460 angle1 = 275
470 angle2 = 90
480 angle3 = 5
490 ratio1 = 0.34
500 ratio2 = 0.29
510 ratio3 = 0.8
520 stemlen = 1 - ratio3
530 DIM point0(2)
540 point0() = 0,0,1
550 p1 = 100 * ratio1^2 / (ratio1^2 + ratio2^2 + ratio3^2)
560 p2 = 100 * (ratio1^2 + ratio2^2) / (ratio1^2 + ratio2^2 + ratio3^2)
570 ENDPROC
580 :
590 DEF PROCcreatemats
600 DIM transmat1(2,2)
610 PROCdeftrans(transmat1(),angle1,ratio1,1,0,2*stemlen/3)
620 DIM transmat2(2,2)
630 PROCdeftrans(transmat2(),angle2,ratio2,-1,0,stemlen)
640 DIM transmat3(2,2)
650 PROCdeftrans(transmat3(),angle3,ratio3,1,0,stemlen)
660 ENDPROC
670 :
680 DEF PROCdeftrans(RETURN transmat(),rotangle,ratio,mirror,shiftx,shifty)
690 LOCAL workmat()
700 DIM workmat(2,2)
710 REM Rotate...
720 transmat(0,0) = COS(RAD(rotangle))
730 transmat(0,1) = SIN(RAD(rotangle))
740 transmat(1,0) = -SIN(RAD(rotangle))
750 transmat(1,1) = COS(RAD(rotangle))
760 transmat(2,2) = 1
770 REM Scale...
780 workmat(0,0) = ratio
790 workmat(1,1) = ratio * mirror
800 workmat(2,2) = 1
810 transmat() = transmat() . workmat()
820 REM Translate...
830 workmat(0,0) = 1
840 workmat(1,1) = 1
850 workmat(2,0) = shiftx
860 workmat(2,1) = shifty
870 workmat(2,2) = 1
880 transmat() = transmat() . workmat()
890 ENDPROC
```

Listing 2

```
10 REM >Fern8 (Info1b)
20 REM Original by Bryan Creer
30 REM 8 Bit version by David Lawrence
40 REM for BBC B/B+/M/C/E/A!
50 REM (c) BAU August 1991
60 :
70 MODE 0
80 VDU 29,640;0;
90 VDU 19,1,2;0;
100 VDU 23;8202;0;0;0;0;
110 PROCinitialise
120 PROCcreatemats
130 REPEAT
140 rnd = RND(101)
150 IF rnd <= p1 PROCtrans(1)
160 IF rnd > p1 AND rnd <= p2 PROCtrans(2)
170 IF rnd > p2 AND rnd <= 100 PROCtrans(3)
180 IF rnd > 100 PROCrandom
190 PLOT 69,point0(0) * 1024,point0(1) * 1024
200 UNTIL FALSE
210 END
220 :
230 DEF PROCinitialise
240 DIM transmat(3,2,2),workmat(2,2),tempmat(2,2),point0(2)
250 angle1 = 275
260 angle2 = 90
270 angle3 = 5
280 ratio1 = 0.34
290 ratio2 = 0.29
300 ratio3 = 0.8
310 stemlen = 1 - ratio3
320 point0(0) = 0
330 point0(1) = 0
340 point0(2) = 1
350 p1 = 100 * ratio1^2 / (ratio1^2 + ratio2^2 + ratio3^2)
360 p2 = 100 * (ratio1^2 + ratio2^2) / (ratio1^2 + ratio2^2 + ratio3^2)
370 ENDPROC
380 :
390 DEF PROCcreatemats
400 FOR mat = 1 TO 3
410 READ rotangle,ratio,mirror,shiftx,shifty
420 transmat(mat,0,0) =  COSRAD(rotangle)
430 transmat(mat,0,1) =  SINRAD(rotangle)
440 transmat(mat,1,0) = -SINRAD(rotangle)
450 transmat(mat,1,1) =  COSRAD(rotangle)
460 transmat(mat,2,2) =  1
470 PROCzerowork
480 workmat(0,0) = ratio
490 workmat(1,1) = ratio * mirror
500 workmat(2,2) = 1
510 PROCmulbywork(mat)
520 PROCzerowork
530 workmat(0,0) = 1
540 workmat(1,1) = 1
550 workmat(2,0) = shiftx
560 workmat(2,1) = shifty
570 workmat(2,2) = 1
580 PROCmulbywork(mat)
590 NEXT
600 ENDPROC
610 :
620 DEF PROCzerowork
630 FOR i=0 TO 2
640 FOR j=0 TO 2
650 workmat(i,j)=0
660 NEXT
670 NEXT
680 ENDPROC
690 :
700 DEF PROCmulbywork(n)
710 FOR i=0 TO 2
720 FOR j=0 TO 2
730 t=0
740 FOR k=0 TO 2
750 t=t+transmat(n,i,k)*workmat(k,j)
760 NEXT
770 tempmat(i,j)=t
780 NEXT
790 NEXT
800 FOR i=0 TO 2
810 FOR j=0 TO 2
820 transmat(n,i,j)=tempmat(i,j)
830 NEXT
840 NEXT
850 ENDPROC
860 :
870 DEF PROCtrans(n)
880 FOR i=0 TO 2
890 t=0
900 FOR j=0 TO 2
910 t=t+point0(j)*transmat(n,j,i)
920 NEXT
930 tempmat(i,0)=t
940 NEXT
950 FOR i=0 TO 2
960 point0(i)=tempmat(i,0)
970 NEXT
980 ENDPROC
990 :
1000 DEF PROCrandom
1010 point0(0)=0
1020 point0(1)=RND(1)*stemlen
1030 ENDPROC
1040 :
1050 DATA angle1,ratio1, 1,0,stemlen*2/3
1060 DATA angle2,ratio2,-1,0,stemlen
1070 DATA angle3,ratio3, 1,0,stemlen
```

Listing 3

```
10 REM >Trees (Info2a)
20 REM By Barry Wickett
30 REM and David Lawrence
40 REM For all machines
50 REM (C) BAU August 1991
60 :
70 arc = (HIMEM > &10000)
80 MODE 1
90 IF arc PROCsetcolours ELSE VDU 19,2,2;0;19,3,4;0;
100 IF NOT arc PROCinittables
110 VDU 23;8202;0;0;0;
120 COLOUR 128+3:CLS
130 GCOL 0,2:MOVE 0,0:DRAW 1280,0
140 REPEAT
150 PROCbranch(128+RND(1024),0,20,0)
160 UNTIL FALSE
170 END
180 :
190 DEF PROCbranch(x,y,r,a)
200 REPEAT
210 r=r-.1
220 a=a+(RND(3)-2)*RND(1)/(r+5)
230 x=x+SIN(a)*4
240 y=y+COS(a)*4
250 GCOL 0,1
260 PROCcirclefill(x,y,r)
```

►




```
  270 IF RND(INT(EXP(-(15-r)/8)*30))<3 AND RND(3)=RND(3) PROCbranch(x,y,r*.9,a+SGN(RND)*RND(1))
  280 IF RND(2)=RND(2) AND r<5 GCOL 0,2:PROCcirclefill(x,y,r*2)
  290 UNTIL r<1
  300 ENDPROC
  310 :
  320 DEF PROCsetcolours
  330 MODE 8
  340 COLOUR 1,90,40,0
  350 COLOUR 2,0,200,0
  360 COLOUR 3,0,0,128
  370 ENDPROC
  380 :
  390 DEF PROCinittables
  400 angles = 8
  410 DIM sin(angles-1),cos(angles-1)
  420 FOR ang = 0 TO angles-1
  430 sin(ang) = SINRAD(ang*360/angles)
  440 cos(ang) = COSRAD(ang*360/angles)
  450 NEXT
  460 ENDPROC
  470 :
  480 DEF PROCcirclefill(x%,y%,r%)
  490 IF arc CIRCLE FILL x%,y%,r% : ENDPROC
  500 MOVE x%,y%+r%
  510 FOR ang = angles-1 TO 0 STEP -1
  520 MOVE x%,y%
  530 PLOT 85,x%+r%*sin(ang),y%+r%*cos(ang)
  540 NEXT
  550 ENDPROC
```

Listing 4

```
   10 REM >GwawpScape (Info3a)
   20 REM By Dave Lawrence
   30 REM For Archimedes only
   40 REM (c) BAU August 1991
   50 :
   60 ON ERROR PROCerror
   70 MODE 0
   80 PROCgetsize
   90 PROCinit
  100 PROCcode
  110 CALL cleardata
  120 PROCdraw
  130 PROCscroll
  140 END
  150 :
  160 DEF PROCerror
  170 MODE 0
  180 IF ERR<>17 PRINTREPORT$;" at line ";ERL
  190 END
  200 :
  210 DEF PROCgetsize
  220 memfree%=HIMEM-END-10240
  230 sqr=INTSQR(memfree%)
  240 xsize=(sqr DIV 64)*64
  250 ysize=((memfree% DIV xsize) DIV 64)*64
  260 PRINT"Maximum size = ";xsize;" x ";ysize
  270 REPEAT
  280 LINEINPUT'"Enter new size (x,y) or Return for default : "size$
  290 IF size$<>"" THEN
  300 xsize=VALsize$
  310 comma=INSTR(size$,",")
  320 IF comma=0 INPUT"ysize :"size$ ELSE size$=MID$(size$,comma+1)
  330 ysize=VALsize$
  340 ENDIF
  350 UNTIL xsize*ysize < memfree%
  360 PRINT
  370 ENDPROC
  380 :
  390 DEF PROCinit
  400 DIM code 4000,Data xsize*ysize,scr(2)
  410 xview=74
  420 yview=74
  430 xpos%=xsize/2
  440 ypos%=ysize/2
  450 flood%=0
  460 xold%=-1
  470 yold%=-1
  480 fold%=-1
  490 bank=1
  500 ENDPROC
  510 :
  520 DEF PROCdraw
  530 circles=(xsize*ysize)*100/(320*256)
  540 radius=40
  550 FOR i=1 TO circles
  560 PRINT"Creating ";circles-i;" hills ";CHR$13;
  570 x=RND(xsize)-1
  580 y=RND(xsize)-1
  590 r=RND(radius)+radius/2
  600 PROClots(x,y,r,2)
  610 NEXT
  620 ENDPROC
  630 :
  640 DEF PROClots(xc,yc,rad,add)
  650 REPEAT
  660 PROCcircle(xc,yc,rad,add)
  670 rad-=2
  680 UNTIL rad<0
  690 ENDPROC
  700 :
  710 DEF PROCcircle(xc%,yc%,rad%,add%)
  720 CALL circle,xc%,yc%,rad%,add%
  730 ENDPROC
  740 :
  750 DEF PROCscroll
  760 MODE 15:MODE 13:OFF
  770 scr(1)=!screen
  780 scr(2)=!screen+320*256
  790 SYS 6,113,3-bank
  800 MOUSE RECTANGLE -256,-256,512,512
  810 MOUSE STEP 1
  820 REPEAT
  830 MOUSE mx,my,buts
  840 MOUSE TO 0,0
  850 xpos%=xpos%+mx-my
  860 ypos%=ypos%-mx-my
  870 IF xpos%<1 xpos%=1
  880 IF ypos%<1 ypos%=1
  890 IF xpos%>xsize-xview-1 xpos%=xsize-xview-1
  900 IF ypos%>ysize-yview-1 ypos%=ysize-yview-1
  910 IF xpos%<>xold% OR ypos%<>yold% OR flood%<>fold% THEN
  920 WAIT
  930 CLS
  940 sc%=scr(bank)
  950 CALL project,sc%,xpos%,ypos%,flood%
  960 xold%=xpos%
  970 yold%=ypos%
  980 fold%=flood%
  990 bank=3-bank
 1000 SYS 6,112,bank
 1010 SYS 6,113,3-bank
 1020 ENDIF
 1030 IF (buts AND 4) AND flood%<255 flood%+=1
 1040 IF (buts AND 1) AND flood%>0 flood%-=1
 1050 UNTIL0
 1060 END
 1070 :
 1080 DEF PROCcode
 1090 xcent=1:ycent=2:r=3:add=4:x=5:y=6:p=7
 1100 xstart=8:xend=9:yline=10:addr=11:scrn=12
 1110 xplot=1:yplot=2:water=3:dif=4:x=5:y=6
 1120 col1=7:col2=8:table=9:poke=10:addr=11:scrn=12
 1130 sp=13:link=14
 1140 FOR pass=0 TO 2 STEP 2
 1150 P%=code
 1160 [OPT pass
 1170 .circle
 1180          STMFD   (sp)!,{link}
 1190          BL      getparams
 1200          CMP     R0,#4
 1210          BNE     badcall
 1220          LDMIA   addr,{R1-R4}
 1230          LDR     scrn,data
 1240          MOV     x,#0
 1250          MOV     y,r
 1260          MOV     r,r,ASL #1
 1270          RSB     p,r,#3
 1280 .main
 1290          SUB     yline,ycent,x
 1300          SUB     xstart,xcent,y
 1310          ADD     xend,xcent,y
 1320          BL      line
 1330          CMP     x,#0
 1340          BEQ     nolower
 1350          ADD     yline,ycent,x
 1360          SUB     xstart,xcent,y
 1370          ADD     xend,xcent,y
 1380          BL      line
 1390 .nolower
 1400          CMP     x,y
 1410          LDMGEFD (sp)!,{PC}
 1420          CMP     p,#0
 1430          ADD     p,p,x,ASL #2
 1440          ADD     x,x,#1
 1450          ADD     p,p,#6
 1460          BMI     main
 1470          SUB     p,p,y,ASL #2
 1480          ADD     p,p,#4
 1490          SUB     x,x,#1
 1500          SUB     yline,ycent,y
 1510          SUB     xstart,xcent,x
 1520          ADD     xend,xcent,x
 1530          BL      line
 1540          SUB     xstart,xcent,x
 1550          ADD     xend,xcent,x
 1560          ADD     yline,ycent,y
 1570          BL      line
 1580          ADD     x,x,#1
 1590          SUB     y,y,#1
 1600          CMP     x,y
 1610          LDMGTFD (sp)!,{PC}
 1620          B       main
 1630
 1640 .line
 1650          CMP     yline,#ysize
 1660          MOVCS   pc,link
 1670          CMP     xstart,#0
 1680          MOVLT   xstart,#0
 1690          CMP     xend,#xsize
 1700          MOVGE   xend,#xsize
 1710          SUBGE   xend,xend,#1
 1720          MOV     addr,#xsize
 1730          MLA     addr,yline,addr,scrn
 1740 .plotline
 1750          LDRB    R0,[addr,xstart]
 1760          ADD     R0,R0,add
 1770          CMP     R0,#255
 1780          STRLTB  R0,[addr,xstart]
 1790          ADD     xstart,xstart,#1
 1800          CMP     xstart,xend
 1810          BLE     plotline
 1820          MOV     pc,link
 1830
 1840 .cleardata
 1850          LDR     R11,data
 1860          LDR     R12,num
 1870          MOV     R0,#0
 1880          MOV     R1,#0
 1890          MOV     R2,#0
 1900          MOV     R3,#0
 1910          MOV     R4,#0
 1920          MOV     R5,#0
 1930          MOV     R6,#0
 1940          MOV     R7,#0
 1950 .cdloop
 1960          STMIA   R11!,{R0-R7}
 1970          SUBS    R12,R12,#1
 1980          BNE     cdloop
 1990          MOV     pc,link
 2000
 2010 .getparams
 2020          ADR     addr,reggies
 2030          ADD     addr,addr,R10,ASL #2
 2040          MOVS    R0,R10
 2050          BEQ     noneparams
 2060 .gploop
 2070          LDMIA   R9!,{R1,R2}
 2080          CMP     R2,#4
 2090          BNE     badcall
 2100          LDR     R1,[R1]
 2110          STMDB   (addr)!,{R1}
 2120          SUBS    R10,R10,#1
 2130          BNE     gploop
 2140 .noneparams
 2150          MOV     pc,link
 2160
 2170 .badcall
 2180          ADR     R0,bcmess
 2190          SWI     "OS_GenerateError"
 2200 .bcmess
 2210          EQUD    0
 2220          EQUS    "Bad call"+CHR$0
 2230          ALIGN
 2240
 2250 .project
 2260          STMFD   (sp)!,{link}
 2270          BL      getparams
 2280          CMP     R0,#4
 2290          BNE     badcall
 2300          LDMIA   addr,{R0-R3}
 2310          MOV     scrn,R0
 2320          LDR     addr,data
 2330          MOV     R0,#xsize
 2340          MLA     addr,R2,R0,addr
 2350          ADD     addr,addr,R1
 2360          MOV     y,#0
 2370 .yloop
 2380          MOV     x,#0
 2390 .xloop
 2400          SUB     xplot,x,y
 2410          MOV     xplot,xplot,ASL #1
 2420          ADD     xplot,xplot,#160
 2430          ADD     yplot,x,y
 2440          ADD     yplot,yplot,#80
 2450          LDRB    R0,[addr],#1
 2460          CMP     R0,water
 2470          BGE     island
 2480          SUB     yplot,yplot,water,LSR #2
 2490          MOV     dif,#1
 2500          ADR     table,seacols
 2510          SUB     R0,water,R0
 2520          MOV     R0,R0,LSR #2
 2530          RSBS    R0,R0,#8
 2540          MOVMI   R0,#0
 2550          B       plot
 2560 .island
 2570          MOV     R0,R0,LSR #2
 2580          MOV     poke,R0
 2590          LDRB    dif,[addr]
 2600          CMP     poke,dif,LSR #2
 2610          MOVGT   poke,dif,LSR #2
 2620          LDRB    dif,[addr,#xsize]
 2630          CMP     poke,dif,LSR #2
 2640          MOVGT   poke,dif,LSR #2
 2650          LDRB    dif,[addr,#xsize-1]
 2660          CMP     poke,dif,LSR #2
 2670          MOVGT   poke,dif,LSR #2
 2680          SUB     dif,R0,poke
 2690          ADD     dif,dif,#1
 2700          ADR     table,landcols
 2710          SUB     yplot,yplot,R0
 2720 .plot
 2730          LDRB    col1,[table,R0,LSR #1]
 2740          ADD     R0,R0,#1
 2750          LDRB    col2,[table,R0,LSR #1]
 2760          CMP     yplot,#1
 2770          MOVLT   yplot,#1
 2780          ADD     poke,scrn,yplot,ASL #6
 2790          ADD     poke,poke,yplot,ASL #8
 2800          STRB    col1,[poke,xplot]!
 2810 .plotloop
 2820          STRB    col2,[poke,#-1]
 2830          STRB    col2,[poke,#1]
 2840          STRB    col2,[poke,#-320]
 2850          STRB    col2,[poke,#320]!
 2860          ADD     col2,col1,col2
 2870          SUB     col1,col2,col1
 2880          SUB     col2,col2,col1
 2890          SUBS    dif,dif,#1
 2900          BNE     plotloop
 2910
 2920 .ignore
 2930          ADD     x,x,#1
 2940          CMP     x,#xview
 2950          BLT     xloop
 2960
 2970          SUB     addr,addr,#xview
 2980          ADD     addr,addr,#xsize
 2990          ADD     y,y,#1
 3000          CMP     y,#yview
 3010          BLT     yloop
 3020          LDMFD   (sp)!,{pc}
 3030
 3040 .landcols
 3050          EQUB &4C:EQUB &4D:EQUB &4E:EQUB &4F
 3060          EQUB &43:EQUB &60:EQUB &61:EQUB &62
 3070          EQUB &63:EQUB &62:EQUB &61:EQUB &60
 3080          EQUB &43:EQUB &42:EQUB &41:EQUB &40
 3090          EQUB &23:EQUB &22:EQUB &21:EQUB &20
 3100
 3110          EQUB &2C:EQUB &2D:EQUB &2E:EQUB &2F
 3120          EQUB &D0:EQUB &D1:EQUB &D2:EQUB &D3
 3130          EQUB &FC:EQUB &FD:EQUB &FE:EQUB &FF
 3140          EQUB &FF
 3150          ALIGN
 3160
 3170          EQUB &08:EQUB &09
 3180 .seacols
 3190          EQUB &0A:EQUB &0B
 3200          EQUB &80:EQUB &81
 3210          EQUB &82:EQUB &83
 3220          EQUB &88:EQUB &89
 3230          EQUB &89
 3240          ALIGN
 3250
 3260 .data    EQUD    Data
 3270 .num     EQUD    xsize*ysize/(4*8)
 3280
 3290 .screen EQUD 148
 3300          EQUD -1
 3310
 3320 .reggies
 3330          EQUD 0:EQUD 0:EQUD 0:EQUD 0
 3340          EQUD 0:EQUD 0:EQUD 0:EQUD 0
 3350 ]NEXT
 3360 SYS "OS_ReadVduVariables",screen,screen
 3370 ENDPROC
```

Listing 5

```
   10 REM >CoastDemo (Info4a)
   20 REM by DA
   30 REM for all machines
   40 REM (c) BAU August 1991
   50 :
   60 MODE 0
   70 VDU 29,640;512;
   80 FOR kink%=0 TO 12
   90 CLS
  100 PRINT"Kink=";kink%
  110 PROCsplit(-640,0,639,0,0)
  120 i=GET
  130 NEXT
  140 END
  150 :
  160 DEF PROCsplit(x1,y1,x2,y2,depth%)
  170 IF depth%=kink% THEN MOVE x1,y1:DRAW x2,y2:ENDPROC
  180 LOCAL midx,midy
  190 ang=FNatn(y2-y1,x2-x1)
  200 dang=RND(61)-31
```

```
  210 ang=ang+dang
  220 len=SQR((x2-x1)^2+(y2-y1)^2)
  230 midx=x1+COSRAD(ang)*len/2
  240 midy=y1+SINRAD(ang)*len/2
  250 PROCsplit(x1,y1,midx,midy,depth%+1
)
  260 PROCsplit(midx,midy,x2,y2,depth%+1
)
  270 ENDPROC
  280 :
  290 DEF FNatn(x,y)
  300 IF x=0 AND y=0 THEN =0
  310 ax=ABS(x)
  320 ay=ABS(y)
  330 IF ax>ay THEN a=90-DEGATN(ay/ax) E
LSE a=DEGATN(ax/ay)
  340 IF y>=0 AND x<0 THEN =360-a
  350 IF y>=0 THEN =a
  360 IF x>=0 THEN =180-a ELSE =180+a
```

Listing 6

```
   10 REM >Coast (Info4b)
   20 REM by DA
   30 REM for Arc only
   40 REM (c) BAU August 1991
   50 :
   60 MODE 0
   70 ORIGIN 640,512
   80 OFF
   90 :
  100 DIM sintab%(1024),costab%(1024),at
ntab%(1024)
  110 FOR i%=0 TO 1024
  120 sintab%(i%)=1024*SIN(PI*i%/512)
  130 costab%(i%)=1024*COS(PI*i%/512)
  140 atntab%(i%)=ATN(i%/1024)*512/PI
  150 NEXT
  160 fix%=RND(-&123)
  170 maxpoints%=1024
  180 sizeofobj%=16
  190 sc%=1024
  200 lim%=1200*sc%
  210 minlen%=16*sc%
  220 DIM heap% maxpoints%*sizeofobj%
  230 FOR i%=0 TO maxpoints%-1
  240 a%=heap%+sizeofobj%*i%
  250 IF i%<maxpoints%-1 THEN a%!8=a%+si
zeofobj% ELSE a%!8=0
  260 IF i%>0 THEN a%!12=0 ELSE a%!12=a%
-sizeofobj%
  270 NEXT
  280 free%=heap%
  290 end%=FNcreatepoint(700*sc%,0*sc%,0
,0)
  300 start%=FNcreatepoint(-700*sc%,0*sc
%,0,0)
  310 mid%=FNcreatepoint(0*sc%,0*sc%,end
%,start%)
  320 start%!8=mid%
  330 start%!12=0
  340 end%!8=0
  350 end%!12=mid%
  360 FOR init%=1 TO 4
  370 PROCprocess(start%)
  380 NEXT
  390 z=1
  400 FOR zoom%=1 TO 1000
  410 PROCprocess(start%)
  420 CLS
  430 PRINT"Zoom: ";INT(z*100);"%"
  440 z=z*1.05
  450 PROCplot(start%)
  460 PROCscale(start%,1.05)
  470 REM wait=GET
  480 NEXT
  490 END
  500 :
  510 DEF PROCfreepoint(a%)
  520 IF a%=start% THEN start%=a%!8
  530 post%=a%!8
  540 pre%=a%!12
  550 IF a%!12>0 THEN !(a%!12+8)=a%!8
  560 IF a%!8>0 THEN !(a%!8+12)=a%!12
  570 a%!8=free%
  580 free%=a%
  590 ENDPROC
  600 :
  610 DEF FNcreatepoint(x%,y%,next%,last
%)
  620 LOCAL p%
  630 IF free%=0 ERROR 0,"Heap full"
  640 p%=free%
  650 free%=free%!8
  660 p%!0 =x%
  670 p%!4 =y%
  680 p%!8 =next%
  690 p%!12=last%
  700 =p%
  710 :
  720 DEF PROCscale(p%,s)
  730 WHILE p%<>0
  740 p%!0=p%!0*s
  750 p%!4=p%!4*s
  760 p%=p%!8
  770 ENDWHILE
  780 ENDPROC
  790 :
  800 DEF PROCprocess(pt1%)
  810 LOCAL x1%,y1%,x2%,y2%,x3%,y3%
  820 LOCAL len%,ang%,ang1%,midx%,midy%,
pt2%,pt3%
  830 LOCAL dx%,dy%
  840 IF pt1%=0 ENDPROC
  850 pt2%=pt1%!8
  860 IF pt2%=0 ENDPROC
  870 REPEAT
  880 clipped%=FALSE
  890 x1%=pt1%!0
  900 y1%=pt1%!4
  910 x2%=pt2%!0
  920 y2%=pt2%!4
  930 IF FNoff(x1%,y1%) AND FNoff(x2%,y2
%) THEN
  940 CASE TRUE OF
  950 WHEN pt1%!12=0:
  960 PROCfreepoint(pt1%)
  970 pt1%=pt2%
  980 clipped%=TRUE
  990 WHEN pt2%!8=0:
 1000 PROCfreepoint(pt2%)
 1010 clipped%=TRUE
 1020 OTHERWISE:
 1030 pt3%=pt2%!8
 1040 IF FNoff(pt3%!0,pt3%!8) THEN
 1050 PROCfreepoint(pt2%)
 1060 clipped%=TRUE
 1070 ENDIF
 1080 ENDCASE
 1090 ENDIF
 1100 IF NOT clipped% THEN
 1110 dx%=(x2%-x1%)/32
 1120 dy%=(y2%-y1%)/32
 1130 len%=32*SQR(dx%*dx%+dy%*dy%)
 1140 IF len%>minlen% THEN
 1150 ang%=FNatn(y2%-y1%,x2%-x1%)
 1160 dang%=RND(121)-61
 1170 ang1%=(ang%+dang%) AND 1023
 1180 midx%=x1%+costab%(ang1%)*len%/2048
 1190 midy%=y1%+sintab%(ang1%)*len%/2048
 1200 pt1%!8=FNcreatepoint(midx%,midy%,p
t2%,pt1%)
 1210 pt2%!12=pt1%!8
 1220 ENDIF
 1230 pt1%=pt2%
 1240 IF pt1%<>0 pt2%=pt1%!8
 1250 ELSE
 1260 pt2%=pt1%!8
 1270 ENDIF
 1280 UNTIL pt1%=0 OR pt2%=0
 1290 ENDPROC
 1300 :
 1310 DEF FNoff(x%,y%)=x%<-lim% OR x%>li
m% OR y%<-lim% OR y1%>lim%
 1320 :
 1330 DEF PROCplot(p%)
 1340 MOVE p%!0/sc%,p%!4/sc%
 1350 p%=p%!8
 1360 WHILE p%<>0
 1370 DRAW p%!0/sc%,p%!4/sc%
 1380 p%=p%!8
 1390 ENDWHILE
 1400 ENDPROC
 1410 :
 1420 DEF FNatn(x%,y%)
 1430 LOCAL a%
 1440 IF x%=0 AND y%=0 THEN =0
 1450 ax%=ABS(x%)
 1460 ay%=ABS(y%)
 1470 IF ax%>ay% THEN a%=256-atntab%(102
4*ay%/ax%) ELSE a%=atntab%(1024*ax%/ay%)
 1480 IF y%>=0 THEN
 1490 IF x%<0 a%=1024-a%
 1500 ELSE
 1510 IF x%>=0 THEN a%=512-a% ELSE a%=51
2+a%
 1520 ENDIF
 1530 =a%
```

Listing 7

```
   10 REM >ArgDemo (Info5a)
   20 REM by Dave Lawton
   30 REM for Arc only
   40 REM (c) BAU August 1991
   50 :
   60 MODE 12
   70 DIM key% &100,command% &100,result
% &100
   80 $key%="fruit/a,flag/s,sum=calculat
ion/e"
   90 PROCexample("-fruit apple -sum 2+2
")
  100 PROCexample("-f pear -flag")
  110 PROCexample("-s 3*3 banana")
  120 END
  130 :
  140 DEF PROCexample(com$)
  150 PRINT"Command tail example: "com$
  160 SYS "OS_ReadArgs",key%,com$,result
%,&100
  170 PRINT"Fruit=";
  180 SYS "OS_Write0",!result%
  190 PRINT
  200 IF result%!4=0 PRINT"Flag=FALSE" E
LSE PRINT"Flag=TRUE"
  210 IF result%!8=0 THEN
  220 PRINT"No value for sum"
  230 ELSE
  240 answer%=result%!8
  250 PRINT"Value of sum=";answer%!1
  260 ENDIF
  270 PRINT
  280 ENDPROC
```

Listing 8

```
   10 REM >SubsDemo (Info5b)
   20 REM by Dave Lawton
   30 REM for Arc only
   40 REM (c) BAU August 1991
   50 :
   60 MODE 12
   70 DIM result% &100,arg% &100
   80 $arg%="one two three four five"
   90 PROCdemo("%0 plus %0 is %1",arg% O
R (1<<31))
  100 PROCdemo("Third argument is %2",ar
g% OR (1<<31))
  110 PROCdemo("Second argument onwards:
 %*1",arg% OR (1<<31))
  120 PROCdemo("With top-bit clear: %0 %
1 %2... ",arg%)
  130 END
  140 :
  150 DEF PROCdemo(template$,arg%)
  160 SYS "OS_SubstituteArgs",arg%,resul
t%,&100,template$,LEN(template$) TO ,,le
n%
  170 PRINT"Template: ";template$
  180 PRINT"Result  : ";
  190 SYS "OS_WriteN",result%,len%
  200 PRINT'
  210 ENDPROC
```

Listing 9

```
   10 REM >EverySrc (Info6a)
   20 REM By DL and DA
   30 REM For Archimedes only
   40 REM (c) BAU August 1991
   50 :
   60 DIM code 4000
   70 ws=12
   80 sp=13
   90 link=14
  100 pc=15
  110 :
  120 command = 0
  130 table   = 256
  140 docom   = 320
  150 dir     = 512
  160 csd     = 768
  170 cmd_c   = 0
  180 cmd_h   = 4
  190 cmd_d   = 8
  200 cmd_v   = 12
  210 cmd_f   = 16
  220 cmd_t   = 20
  230 cmd_q   = 24
  240 cmd_s   = 28
  250 cmd_n   = 32
  260 crlf$   = CHR$10+CHR$13
  270 crlf2$  = crlf$+crlf$
  280 FOR pass=0 TO 2 STEP 2
  290 P%=code
  300 [OPT pass
  310 .alldirs
  320           STMFD   (sp)!,{link}
  330           ADD     R10,ws,#command
  340           LDRB    R0,[R1]
  350           CMP     R0,#32
  360           BLT     showhelp
  370           MOV     R2,#0
  380 .copypars
  390           LDRB    R0,[R1,R2]
  400           CMP     R0,#32
  410           MOVLT   R0,#13
  420           STRB    R0,[R10,R2]
  430           ADD     R2,R2,#1
  440           BGE     copypars
  450           STR     R2,comend
  460           STR     sp,stack
  470           ADR     R0,key
  480           ADD     R1,ws,#command
  490           ADD     R2,ws,#table
  500           MOV     R3,#256
  510           SWI     "XOS_ReadArgs"
  520           LDMVSFD (sp)!,{pc}
  530           LDR     R1,[ws,#table+cmd_
n]
  540           CMP     R1,#0
  550           STRNE   R1,[ws,#table+cmd_
v]
  560           LDR     R1,[ws,#table+cmd_
t]
  570           CMP     R1,#0
  580           BEQ     notype
  590           MVN     R0,#0
  600           STR     R0,[ws,#table+cmd_
f]
  610           MOV     R0,#31
  620           SWI     "XOS_FSControl"
  630           BVC     gottype
  640           BIC     R0,pc,#1<<28
  650           TEQP    pc,R0
  660           MOV     R0,#16
  670           ORR     R0,R0,#1<<29
  680           LDR     R1,[ws,#table+cmd_
t]
  690           MOV     R2,#&1000
  700           SUB     R2,R2,#1
  710           SWI     "XOS_ReadUnsigned"
  720           LDMVSFD (sp)!,{pc}
  730 .gottype
  740           STR     R2,type
  750 .notype
  760           LDR     R1,[ws,#table+cmd_
c]
  770           CMP     R1,#0
  780           STREQB  R1,[ws,#command]
  790           BEQ     nocommandgiven
  800           ADD     R10,ws,#command
  810           MOV     R2,#0
  820 .copycom
  830           LDRB    R0,[R1,R2]
  840           STRB    R0,[R10,R2]
  850           ADD     R2,R2,#1
  860           CMP     R0,#32
  870           BGE     copycom
  880           STR     R2,comend
  890 .nocommandgiven
  900           LDR     R0,[ws,#table+cmd_
h]
  910           CMP     R0,#0
  920           BEQ     nothlp
  930 .showhelp
  940           ADR     R0,helpmess
  950           MOV     R1,#0
  960           SWI     "OS_PrettyPrint"
  970           LDMFD   (sp)!,{pc}
  980 .nothlp
  990
 1000           MOV     R10,#0
 1010 .getpath
 1020           MOV     R0,#6
 1030           ADR     R2,fileblock
 1040           SWI     "XOS_GBPB"
 1050           LDRVS   sp,stack
 1060           LDMVSFD (sp)!,{pc}
 1070           ADD     R2,R2,#1
 1080           BL      copyname
 1090           CMP     R0,#ASC"$"
 1100           BEQ     reachedroot
 1110           MOV     R0,#ASC"."
 1120           BL      addchar
 1130           MOV     R0,#0
 1140           ADR     R1,up
 1150           SWI     "XOS_FSControl"
 1160           B       getpath
 1170 .reachedroot
 1180           MOV     R0,#5
 1190           ADR     R2,fileblock
 1200           SWI     "XOS_GBPB"
 1210           LDRVS   sp,stack
 1220           LDMVSFD (sp)!,{pc}
 1230           LDRB    R1,[R2]
 1240           CMP     R1,#0
 1250           BEQ     adiscwithnoname
 1260           MOV     R0,#ASC"."
 1270           BL      addchar
 1280           BL      copyname
 1290           MOV     R0,#ASC":"
 1300           BL      addchar
 1310 .adiscwithnoname
 1320           MOV     R0,#0
 1330           MOV     R1,#0
 1340           MOV     R2,#0
 1350           SWI     "XOS_Args"
 1360           MOV     R1,R0
 1370           MOV     R0,#33
 1380           ADR     R2,fileblock
 1390           MOV     R3,#16
 1400           SWI     "XOS_FSControl"
 1410           MOV     R0,#ASC":"
 1420           BL      addchar
 1430           MOV     R1,#0
 1440 .find0
 1450           LDRB    R0,[R2,R1]
 1460           ADD     R1,R1,#1
 1470           CMP     R0,#0
 1480           BNE     find0
 1490           SUB     R2,R2,#1
 1500           SUB     R1,R1,#1
 1510           BL      copyloop
 1520           ADD     R1,ws,#csd
 1530 .makecsd
 1540           LDRB    R0,[sp],#1
 1550           STRB    R0,[R1],#1
 1560           SUBS    R10,R10,#1
 1570           BNE     makecsd
 1580           MOV     R0,#13
 1590           STRB    R0,[R1]
 1600           LDR     R2,[ws,#table+cmd_
d]
 1610           CMP     R2,#0
 1620           LDREQ   R0,root
 1630           STREQ   R0,[ws,#dir]
 1640           MOVEQ   R9,#1
 1650           BEQ     gotdir
 1660           ADD     R1,ws,#dir
 1670           MOV     R9,#0
```




```
 1680 .cpydir LDRB    RØ,[R2,R9]
 1690         CMP     RØ,#32
 1700         MOVLT   RØ,#Ø
 1710         STRB    RØ,[R1,R9]
 1720         ADD     R9,R9,#1
 1730         BGE     cpydir
 1740         SUB     R9,R9,#1
 1750 .gotdir
 1760         BL      dodirectory
 1770 .gotocsd
 1780         MOV     RØ,#Ø
 1790         ADD     R1,ws,#csd
 1800         SWI     "XOS_FSControl"
 1810         LDMFD   (sp)!,{pc}
 1820
 1830 .dodirectory
 1840         STMFD   (sp)!,{link}
 1850         SWI     "XOS_ReadEscapeSta
te"
 1860         BCC     notescape
 1870         MOV     RØ,#Ø
 1880         ADD     R1,ws,#csd
 1890         SWI     "XOS_FSControl"
 1900         LDR     sp,stack
 1910         ADR     RØ,escape
 1920         SWI     "XOS_GenerateError
"
 1930         LDMFD   (sp)!,{pc}
 1940
 1950 .escape EQUD    17
 1960         EQUS    "Escape"+CHR$Ø
 1970         ALIGN
 1980
 1990 .notescape
 2000         LDR     RØ,[ws,#table+cmd_
v]
 2010         CMP     RØ,#Ø
 2020         BEQ     dontshowinfo
 2030         SWI     "XOS_WriteS"
 2040         EQUS    "*Dir "
 2050         EQUB    Ø
 2060         ALIGN
 2070         ADD     RØ,ws,#dir
 2080         MOV     R1,R9
 2090         SWI     "XOS_WriteN"
 2100         SWI     "XOS_NewLine"
 2110 .dontshowinfo
 2120         BL      seldir
 2130         LDR     RØ,[ws,#table+cmd_
f]
 2140         CMP     RØ,#Ø
 2150         BNE     filemode
 2160         ADD     R1,ws,#command
 2170         LDR     R2,[ws,#table+cmd_
v]
 2180         CMP     R2,#Ø
 2190         BEQ     dontshowcom1
 2200         SWI     &100+ASC"*"
 2210         MOV     RØ,R1
 2220         SWI     "XOS_WriteØ"
 2230         SWI     "XOS_NewLine"
 2240 .dontshowcom1
 2250         MOV     RØ,R1
 2260         BL      oscli
 2270 .filemode
 2280         MOV     R4,#Ø
 2290 .readnames
 2300         MOV     RØ,#1Ø
 2310         ADD     R1,ws,#dir
 2320         ADR     R2,fileblock
 2330         MOV     R3,#1
 2340         MOV     R5,#32
 2350         MOV     R6,#Ø
 2360         SWI     "XOS_GBPB"
 2370         CMP     R4,#Ø
 2380         LDMLTFD (sp)!,{pc}
 2390         LDR     RØ,obtype
 2400         CMP     RØ,#1
 2410         BNE     notfile
 2420         LDR     RØ,[ws,#table+cmd_
f]
 2430         CMP     RØ,#Ø
 2440         BEQ     readnames
 2450         LDR     RØ,type
 2460         CMP     RØ,#Ø
 2470         BLT     anytype
 2480         LDR     R1,loadad
 2490         MOV     R1,R1,ASL #12
 2500         MOV     R1,R1,LSR #2Ø
 2510         CMP     RØ,R1
 2520         BNE     readnames
 2530 .anytype
 2540         STMFD   (sp)!,{R4}
 2550         BL      seldir
 2560         ADR     RØ,obname
 2570         ADD     R1,ws,#docom
 2580         MOV     R2,#192
 2590         ADD     R3,ws,#command
 2600         LDR     R4,comend
 2610         SWI     "XOS_SubstituteArg
s"
 2620         LDRVS   sp,stack
 2630         LDMVSFD (sp)!,{pc}
 2640         LDR     R2,[ws,#table+cmd_
v]
 2650         CMP     R2,#Ø
 2660         BEQ     dontshowcom2
 2670         SWI     &100+ASC"*"
 2680         MOV     RØ,R1
 2690         SWI     "XOS_WriteØ"
 2700         SWI     "XOS_NewLine"
 2710 .dontshowcom2
 2720         MOV     RØ,R1
 2730         BL      oscli
 2740         LDMFD   (sp)!,{R4}
 2750         B       readnames
 2760 .notfile
 2770         CMP     RØ,#2
 2780         BNE     readnames
 2790         LDR     RØ,[ws,#table+cmd_
s]
 2800         CMP     RØ,#Ø
 2810         BNE     readnames
 2820         STMFD   (sp)!,{R4,R9}
 2830         ADR     R1Ø,obname
 2840         ADD     R11,ws,#dir
 2850         MOV     RØ,#ASC"."
 2860         STRB    RØ,[R11,R9]
 2870 .adddirname
 2880         ADD     R9,R9,#1
 2890         LDRB    RØ,[R1Ø],#1
 2900         STRB    RØ,[R11,R9]
 2910         CMP     RØ,#Ø
 2920         BNE     adddirname
 2930         MOV     RØ,#13
 2940         STRB    RØ,[R11,R9]
 2950         BL      dodirectory
 2960         LDMFD   (sp)!,{R4,R9}
 2970         ADD     R11,ws,#dir
 2980         MOV     RØ,#13
 2990         STRB    RØ,[R11,R9]
 3000         B       readnames
 3010 .copyname
 3020         LDRB    R1,[R2]
 3030 .copyloop
 3040         LDRB    RØ,[R2,R1]
 3050         STRB    RØ,[sp,#-1]!
 3060         ADD     R1Ø,R1Ø,#1
 3070         SUBS    R1,R1,#1
 3080         BNE     copyloop
 3090         MOVS    pc,link
 3100 .addchar
 3110         STRB    RØ,[sp,#-1]!
 3120         ADD     R1Ø,R1Ø,#1
 3130         MOV     pc,link
 3140 .seldir STMFD   (sp)!,{link}
 3150         MOV     RØ,#Ø
 3160         ADD     R1,ws,#dir
 3170         SWI     "XOS_FSControl"
 3180         LDRVS   sp,stack
 3190         LDMFD   (sp)!,{pc}
 3200
 3210 .oscli  LDR     R1,[ws,#table+cmd_
n]
 3220         CMP     R1,#Ø
 3230         BICNES  pc,link,#1<<28
 3240         SWI     "XOS_CLI"
 3250         MOVVC   pc,link
 3260         LDR     R1,[ws,#table+cmd_
q]
 3270         CMP     R1,#Ø
 3280         BICNES  pc,link,#1<<28
 3290         LDR     sp,stack
 3300         LDMFD   (sp)!,{link}
 3310         ORRS    pc,link,#1<<28
 3320
 3330 .up     EQUS    "^"+CHR$13
 3340         ALIGN
 3350 .root   EQUS    "$"+CHR$13
 3360         ALIGN
 3370 .stack  EQUD  Ø
 3380
 3390 .key    EQUS "command,"
 3400         EQUS "help/s,"
 3410         EQUS "directory/k,"
 3420         EQUS "verbose/s,"
 3430         EQUS "file/s,"
 3440         EQUS "type/k,"
 3450         EQUS "quiet/s,"
 3460         EQUS "single/s,"
 3470         EQUS "noexecute/s"
 3480         EQUB 13
 3490         ALIGN
 3500
 3510 .type   EQUD -1
 3520 .comend EQUD Ø
 3530 .fileblock
 3540 .loadad EQUD Ø
 3550 .execad EQUD Ø
 3560 .length EQUD Ø
 3570 .attrib EQUD Ø
 3580 .obtype EQUD Ø
 3590 .obname EQUD Ø:EQUD Ø:EQUD Ø:EQUD
Ø
 3600
 3610 .helpmess
 3620         EQUS "Recursive command ex
ecuter"+crlf2$
 3630         EQUS "Keywords:"+crlf2$
 3640         EQUS "Upper case indicates
 allowable abbreviation"+crlf$
 3650
 3660         FNcom("Command","*Command
to execute in each directory")
 3670         FNcom("Directory","Directo
ry to start from (default = $)")
 3680         FNcom("File","If present,
execute command on each file")
 3690         FNcom("Help","Display this
 help")
 3700         FNcom("Noexecute","Don't e
xecute commands (sets -verbose option)")
 3710         FNcom("Single","If present
, apply to single level (don't recurse)"
)
 3720         FNcom("Quiet","If present,
 suppress error messages")
 3730         FNcom("Type","Specify file
 type (sets -file option)")
 3740         FNcom("Verbose","If presen
t, print each directory name")
 3750         EQUB Ø
 3760         ALIGN
 3770 ]
 3780 NEXT
 3790 SYS "OS_File",1Ø,"%.EveryWhere",&F
FC,,code,P%
 3800 END
 3810 :
 3820 DEF FNcom(com$,help$)
 3830 [OPT pass
 3840         EQUS "-"+com$
 3850         EQUS STRING$(1Ø-LENcom$,CH
R$31)
 3860         EQUS ": "+help$
 3870         EQUS crlf$
 3880 ]
 3890 =""
```

Listing 10

```
   1Ø REM >MakeFont32 (Info7a)
   2Ø REM By Garry Hill
   3Ø REM For Archimedes only
   4Ø REM (c) BAU August 1991
   5Ø :
   6Ø MODE 13:OFF
   7Ø DIM block% 91*1Ø24,screen% 8
   8Ø !screen%=148:screen%!4=-1
   9Ø SYS "OS_ReadVduVariables",screen%,
screen%
  1ØØ screen%=!screen%
  11Ø count%=Ø
  12Ø FOR s%=32 TO 122
  13Ø PRINTTAB(Ø,Ø)CHR$s%
  14Ø FOR y%=31 TO Ø STEP -1
  15Ø FOR x%=Ø TO 31
  16Ø IF POINT(x%,y%+992) > Ø THEN
  17Ø GCOL 9 TINT (x%+4Ø+y%)*1Ø
  18Ø RECTANGLE (x%-1)*4,(y%-1)*4,4,4
  19Ø ENDIF
  2ØØ NEXT
  21Ø NEXT
  22Ø FOR y%=(32*4) TO 4 STEP -4
  23Ø FOR x%=Ø TO (31*4) STEP 4
  24Ø a%=x% DIV 4
  25Ø b%=y% DIV 4
  26Ø adr%=32Ø*(256-b%)+a%
  27Ø block%?count%=screen%?adr%
  28Ø screen%?adr%=Ø
  29Ø count%+=1
  3ØØ NEXT
  31Ø NEXT
  32Ø CLS
  33Ø NEXT
  34Ø SYS "OS_File",1Ø,"Font32",&FFD,,bl
ock%,block%+count%
```

Listing 11

```
   1Ø REM >MakeText32 (Info7b)
   2Ø REM By Garry Hill
   3Ø REM For Arc only
   4Ø REM (c) BAU August 1991
   5Ø :
   6Ø out=OPENOUT("Text32")
   7Ø REPEAT
   8Ø READ a$
   9Ø IF a$=STR$VALa$ BPUT#out,VALa$ ELS
E PROCwrite(a$)
  1ØØ UNTIL a$="(end)"
  11Ø CLOSE #out
  12Ø END
  13Ø :
  14Ø DEF PROCwrite(str$)
  15Ø IF str$="(end)" ENDPROC
  16Ø FOR i=1 TO LENstr$
  17Ø BPUT#out,ASCMID$(str$,i,1)
  18Ø NEXT
  19Ø ENDPROC
  2ØØ :
  21Ø DATA 4Ø,"         -Hello!- ",Ø,32,
32,15Ø," This is a wavy "
  22Ø DATA "scroll-text program by Garry
 Hill",Ø,32,32,1ØØ
  23Ø DATA ". This message is read from
the file 'Text32' which "
  24Ø DATA "contains control codes descr
ibed in the *",2,36,Ø,Ø,"Info column "
  25Ø DATA 2,4Ø,Ø,Ø," The font is create
d by 'MakeFont' from the system "
  26Ø DATA "characters. The letters coul
d equally be created from MODE 13"
  27Ø DATA Ø,36,32,255," sprites that ar
e 32*32 pixels and have been converted "
  28Ø DATA "by a similar routine to the
one I have used in 'MakeFont'. The "
  29Ø DATA "speed of the message can be
easily  ",Ø,36,32,1ØØ," controlled "
  3ØØ DATA "and you can also do a rather
 spectacular      BOOP",1,Ø,Ø,Ø
  31Ø DATA "         The wavy path that th
e characters follow can be changed "
  32Ø DATA "by altering the values of ",
2,36,Ø,Ø,"pitch%, amp% and centre%, "
  33Ø DATA 2,4Ø,Ø,Ø,"these values are ch
ecked to see if the text has been "
  34Ø DATA "pushed too far up or down.
        ",4,52,32,6Ø,"You can also "
  35Ø DATA "change the width of the disp
layed text by changing the values "
  36Ø DATA "that R7 loops between (start
% and finish%)",4,32,32,8Ø,"."
  37Ø DATA "           __________",Ø,32,33,1Ø
Ø,"          ",2,36,Ø,Ø,"    Bye!   "
  38Ø DATA Ø,32,34,Ø,"                 ",13
  39Ø :
  4ØØ DATA (end)
```

Listing 12

```
   1Ø REM >Scroll32 (Info7c)
   2Ø REM By Garry Hill
   3Ø REM For Archimedes only
   4Ø REM (c) August 1991
   5Ø :
   6Ø MODE 15:MODE 13:OFF
   7Ø ON ERROR OSCLI "CLOSE":MODE Ø:REPO
RT:PRINT ERL:END
   8Ø :
   9Ø text$="Text32"
  1ØØ font$="Font32"
  11Ø :
  12Ø PROCinit
  13Ø PROCassemble
  14Ø CALL scroll
  15Ø END
  16Ø :
  17Ø DEF PROCinit
  18Ø f%=OPENINtext$
  19Ø length%=EXT#f%
  2ØØ CLOSE#f%
  21Ø DIM code% 93*1Ø24+length%*32
  22Ø start%  =   Ø   : REM  Values betw
een
  23Ø finish% =  8Ø   : REM  Ø and 8Ø (i
nclusive)
  24Ø amp%    = 1ØØ
  25Ø pitch   =   Ø.25
  26Ø centre% = 576
  27Ø IF centre%+amp% > 1Ø24 OR centre%-
amp%-(32*4) < Ø THEN
  28Ø ERROR 1,"Illegal values assigned t
o amp% and/or centre%"
  29Ø ENDIF
  3ØØ ENDPROC
  31Ø :
  32Ø DEF PROCassemble
  33Ø x=7
  34Ø sp=13
  35Ø link=14
  36Ø pc=15
  37Ø FOR pass%=Ø TO 2 STEP 2
  38Ø P%=code%
  39Ø [OPT pass%
  4ØØ :
  41Ø .scroll
  42Ø           STMFD   (sp)!,{link}
  43Ø           MOV     RØ,#112
  44Ø           MOV     R1,#1
  45Ø           SWI     "OS_Byte"
  46Ø           MOV     RØ,#113
  47Ø           MOV     R1,#2
  48Ø           SWI     "OS_Byte"
  49Ø           ADR     RØ,vdu
  5ØØ           ADR     R1,screen
  51Ø           SWI     "OS_ReadVduVariabl
es"
  52Ø           BL      compile
  53Ø           ADR     R6,message
  54Ø           LDR     R11,[R6],#4
  55Ø           STR     R11,speed
  56Ø           MOV     R12,#Ø
  57Ø           MOV     R9,#36Ø
  58Ø .loop     SUB     R9,R9,#4
  59Ø           CMP     R9,#Ø
  6ØØ           MOVLE   R9,#36Ø
  61Ø           ADD     R1Ø,R8,R9
  62Ø           LDR     x,start
  63Ø           MOV     R4,R6
  64Ø           BL      screen_swap
  65Ø .plot_text
  66Ø           LDR     R1,[R4],#4
  67Ø           CMP     R1,R3
  68Ø           BLT     plot_text
  69Ø           LDR     R5,[R1Ø],#4
  7ØØ           LDR     RØ,screen
  71Ø           ADD     R5,R5,RØ
  72Ø           ADD     R5,R5,x,LSL #2
  73Ø ]
  74Ø FOR i%=1 TO 32
  75Ø [OPT pass%
  76Ø           LDR     RØ,[R1],#32
```

```
 770        STR     R0,[R5],#320
 780 ]NEXT
 790 [OPT pass%
 800        ADD     x,x,#1
 810        LDR     R0,finish
 820        CMP     x,R0
 830        BLT     plot_text
 840        MOV     R0,#0
 850 .look_for_cntrl
 860        LDR     R1,[R4],#4
 870        CMP     R1,R3
 880        BGE     not_cntrl
 890        RSB     R1,R1,#0
 900        CMP     R1,#32
 910        BNE     not_speed
 920        LDR     R0,[R4],#4
 930        CMP     R0,#0
 940        ADDEQ   R6,R6,R11
 950        MOV     R11,R0
 960        LDR     R12,[R4],#4
 970 .not_speed
 980        CMP     R1,#31
 990        SWIEQ   &100+7
 1000       ADDEQ   R4,R4,#8
 1010       CMP     R1,#30
 1020       LDREQ   R0,[R4],#8
 1030       STREQ   R0,speed
 1040       CMP     R1,#28
 1050       LDREQ   R0,[R4],#4
 1060       STREQ   R0,start
 1070       LDREQ   R0,[R4],#4
 1080       STREQ   R0,finish
 1090 .not_cntrl
 1100       ADD     R0,R0,#4
 1110       CMP     R0,R11
 1120       BLT     look_for_cntrl
 1130       SUB     R12,R12,#1
 1140       CMP     R12,#0
 1150       LDRLE   R11,speed
 1160       ADD     R6,R6,R11
 1170       LDR     R0,[R6]
 1180       CMP     R0,R3
 1190       ADDLT   R6,R6,#12
 1200       LDR     R0,end
 1210       CMP     R6,R0
 1220       ADRGE   R6,message
 1230       LDRGE   R1,[R6],#4
 1240       STRGE   R1,speed
 1250       ADR     R1,message
 1260       CMP     R6,R1
 1270       MOVLT   R6,R0
 1280       MOV     R0,#19
 1290       SWI     "OS_Byte"
 1300       SWI     "OS_ReadEscapeStat
e"
 1310       BCC     loop
 1320       LDMFD   (sp)!,{pc}
 1330 :
 1340 .compile
 1350       STMFD   (sp)!,{link}
 1360       MOV     R0,#&C3
 1370       ADR     R1,filename
 1380       SWI     "OS_Find"
 1390       MOV     R1,R0
 1400       LDR     R3,font
 1410       LDR     R8,path
 1420       MOV     R4,#0
 1430       ADR     R5,message
 1440       MOV     R6,#0
 1450       SWI     "OS_BGet"
 1460       SUB     R0,R0,#32
 1470       STR     R0,[R5],#4
 1480 .compile_loop
 1490       SWI     "OS_BGet"
 1500       BCS     end_of_text
 1510       CMP     R0,#&0D
 1520       BEQ     end_of_text
 1530       CMP     R0,#&0A
 1540       BEQ     end_of_text
 1550       SUB     R0,R0,#32
 1560       CMP     R0,#0
 1570       BGE     not_control_code
 1580       LDR     R2,[R5,#-4]
 1590       STR     R2,[R5,#8]
 1600       STR     R0,[R5,#-4]
 1610       SWI     "OS_BGet"
 1620       SUB     R0,R0,#32
 1630       STR     R0,[R5,#0]
 1640       SWI     "OS_BGet"
 1650       SUB     R2,R0,#32
 1660       SWI     "OS_BGet"
 1670       ADD     R0,R0,R2,LSL #8
 1680       STR     R0,[R5,#4]
 1690       ADD     R6,R6,#12
 1700       ADD     R5,R5,#12
 1710       B       compile_loop
 1720 .not_control_code
 1730       ADD     R0,R3,R0,LSL #10
 1740       STR     R0,[R5],#4
 1750       MOV     R7,#7
 1760 .increments
 1770       ADD     R0,R0,#4
 1780       STR     R0,[R5],#4
 1790       SUBS    R7,R7,#1
 1800       BNE     increments
 1810       ADD     R4,R4,#1
 1820       B       compile_loop
 1830 .end_of_text
 1840       MOV     R4,R4,LSL #5
 1850       SUB     R4,R4,#320
 1860       ADR     R0,message
 1870       ADD     R4,R4,R0
 1880       ADD     R4,R4,R6
 1890       STR     R4,end
 1900       MOV     R0,#0
 1910       SWI     "OS_Find"
 1920       LDMFD   (sp)!,{pc}
 1930 :
 1940 .screen_swap
 1950       STMFD   (sp)!,{R0-R11,link
}
 1960       LDR     R0,screen
 1970       LDR     R1,screen+4
 1980       STR     R1,screen
 1990       STR     R0,screen+4
 2000       MOV     R0,#112
 2010       LDR     R1,lookat
 2020       SWI     "OS_Byte"
 2030       LDR     R1,lookat
 2040       RSB     R1,R1,#3
 2050       STR     R1,lookat
 2060       MOV     R0,#113
 2070       SWI     "OS_Byte"
 2080       ADR     R11,zeros
 2090       LDMIA   R11,{R0-R9}
 2100       LDR     R11,screen
 2110       MOV     R10,#&14000
 2120 .cls_loop
 2130       STMIA   R11!,{R0-R9}
 2140       STMIA   R11!,{R0-R9}
 2150       SUBS    R10,R10,#80
 2160       BNE     cls_loop
 2170       LDMFD   (sp)!,{R0-R11,pc}
 2180 :
 2190 .font   EQUD    font%
 2200 .path   EQUD    path%
 2210 .zeros  EQUS    STRING$(4*10,CHR$0
)
 2220 .start  EQUD    start%
 2230 .finish EQUD    finish%
 2240 .speed  EQUD    0
 2250 .lookat EQUD    2
 2260 .end    EQUD    0
 2270 .screen EQUD    0
 2280         EQUD    0
 2290 .vdu    EQUD    148
 2300         EQUD    149
 2310         EQUD    -1
 2320 .filename
 2330         EQUS    text$
 2340         EQUB    0
 2350         ALIGN
 2360 ]
 2370 message=P%:P%+=length%*32
 2380 font%=P%:P%+=91*1024
 2390 path%=P%
 2400 NEXT
 2410 FOR x%=0 TO 2720 STEP 16
 2420 y%=(SINRAD(x%*pitch)*amp%)+centre%
 2430 !P%=320*(255-(y% DIV 4))
 2440 P%+=4
 2450 NEXT
 2460 SYS "OS_File",&FF,font$,font%
 2470 ENDPROC
```

Listing 13

```
 10 REM >MakeFont8 (Info7d)
 20 REM By Dave Lawrence
 30 REM For all machines
 40 REM (c) BAU August 1991
 50 :
 60 MODE 4
 70 VDU 23;8202;0;0;0;
 80 DIM block 10,grid(15,15)
 90 xbase=0
 100 ybase=255
 110 out=OPENOUT("Font8")
 120 FOR char = ASC" " TO ASC"~"
 130 ?block = char
 140 X% = block MOD 256
 150 Y% = block DIV 256
 160 A% = 10
 170 CALL &FFF1
 180 FOR x=0 TO 15
 190 FOR y=0 TO 15
 200 grid(x,y)=0
 210 NEXT
 220 NEXT
 230 FOR line = 1 TO 8
 240 byte = block?line
 250 FOR bit = 7 TO 0 STEP - 1
 260 PROCset(2*(7-bit),2*(line-1)+1,2*S
GN(byte AND 2^bit))
 270 NEXT
 280 NEXT
 290 FOR i=0 TO 15
 300 FOR j=0 TO 15
 310 IF i<>15 PROCnot15
 320 IF i<>0  PROCnot0
 330 NEXT
 340 NEXT
 350 v=1
 360 FOR x=0 TO 15
 370 FOR y=0 TO 15
 380 IF grid(x,y)=2 grid(x,y)=v
 390 v=1-v
 400 NEXT
 410 v=1-v
 420 NEXT
 430 FOR y=0 TO 15
 440 FOR c=0 TO 1
 450 byte=0
 460 mask=128
 470 FOR b=7 TO 0 STEP -1
 480 x=(7-b)+c*8
 490 IF grid(x,y)=1 PLOT 69,(xbase+x)*4
,(ybase-y)*4:byte=byte OR mask
 500 mask = mask DIV 2
 510 NEXT
 520 BPUT #out,byte
 530 NEXT
 540 NEXT
 550 xbase=xbase+20
 560 IF xbase>300 xbase=0:ybase=ybase-2
0
 570 NEXT
 580 CLOSE #out
 590 END
 600 :
 610 DEF PROCnot15
 620 IF grid(j,i)=0 AND grid(j,i+1)=2 g
rid(j,i)=1
 630 IF grid(i,j)=0 AND grid(i+1,j)=2 g
rid(i,j)=1
 640 ENDPROC
 650 :
 660 DEF PROCnot0
 670 IF grid(j,i)=0 AND grid(j,i-1)=2 g
rid(j,i)=1
 680 IF grid(i,j)=0 AND grid(i-1,j)=2 g
rid(i,j)=1
 690 ENDPROC
 700 :
 710 DEF PROCset(x,y,v)
 720 grid(x,y)=v
 730 grid(x+1,y)=v
 740 IF y=15 ENDPROC
 750 grid(x,y+1)=v
 760 grid(x+1,y+1)=v
 770 ENDPROC
```

Listing 14

```
 10 REM >MakeSin (Info7e)
 20 REM By Dave Lawrence
 30 REM For all machines
 40 REM (c) BAU August 1991
 50 :
 60 angles = 512
 70 file = OPENOUT("SinTab")
 80 FOR i=0 TO angles-1+256
 90 PRINT"Creating ";angles-1+256-i;"
";CHR$13;
 100 BPUT #file,127+80*SINRAD(i*360/ang
les)
 110 NEXT
 120 CLOSE #file
 130 PRINT"SinTab created"
```

Listing 15

```
 10 REM >MakeText8 (Info7f)
 20 REM By Dave Lawrence
 30 REM For all machines
 40 REM (c) BAU August 1991
 50 :
 60 out=OPENOUT("Text8")
 70 REPEAT
 80 READ a$
 90 IF a$=STR$VALa$ BPUT#out,VALa$ ELS
E PROCwrite(a$)
 100 UNTIL a$="(end)"
 110 CLOSE #out
 120 END
 130 :
 140 DEF PROCwrite(str$)
 150 IF str$="(end)" ENDPROC
 160 FOR i=1 TO LENstr$
 170 BPUT#out,ASCMID$(str$,i,1)
 180 NEXT
 190 ENDPROC
 200 :
 210 DATA "...............",1,2,"This i
s an ",1,4,"example of "
 220 DATA 0,0,64," Acorn ",1,8,"User's
",0,0,32
 230 DATA " Wavy Scroll  routine.....
...",1,1
 240 DATA "It ",1,0,"has fully ",1,2,"v
ariable "
 250 DATA 1,4,"wobble ",0,1,0,"and ",0,
8,0,"scroll speed "
 260 DATA 0,2,0,"which ",0,4,0,"can be
",0,1,0,"used "
 270 DATA 1,0,"for ",0,0,32,"v",1,4,"ar
ious effects...",4
 280 :
 290 DATA (end)
```

Listing 16

```
 10 REM >Scroll8 (Info7g)
 20 REM By Dave Lawrence
 30 REM For 8 bit machines (Not !65Hos
t)
 40 REM (c) BAU August 1991
 50 :
 60 MODE 0:MODE 4
 70 screen1=&8000-(256*256/8)
 80 screen2=screen1-(256*256/8)
 90 angles=FNsizeof("Sintab")
 100 sins%=((screen2-angles) DIV 256)*2
56
 110 REMsine%=sins%+angles-256
 120 HIMEM=sins%
 130 VDU 23;1,32;0;0;0;
 140 VDU 23;10,32;0;0;0;
 150 PROCcode
 160 ?sinspeed=4
 170 ?scroll=2
 180 CALL go
 190 END
 200 :
 210 DEF PROCcode
 220 chars=FNsizeof("Font8")/32
 230 textlen=FNsizeof("Text8")
 240 DIM code 1500,chars% chars*32,text
% textlen
 250 zp=&70
 260 read=FNzp(2)
 270 write=FNzp(2)
 280 pokescr=FNzp(1)
 290 dispscr=FNzp(1)
 300 line=FNzp(1)
 310 xmod8=FNzp(1)
 320 yoff=FNzp(1)
 330 bytes=FNzp(3)
 340 sins=FNzp(2)
 350 xbase=FNzp(1)
 360 xpos=FNzp(1)
 370 text=FNzp(2)
 380 text2=FNzp(2)
 390 tptr=FNzp(1)
 400 sinspeed=FNzp(1)
 410 scroll=FNzp(1)
 420 oscroll=FNzp(1)
 430 time=FNzp(1)
 440 osbyte=&FFF4
 450 FOR pass=0 TO 2 STEP 2
 460 P%=code
 470 [OPT pass
 480 .go
 490 LDA #screen1 DIV 256
 500 STA pokescr
 510 LDA #screen2 DIV 256
 520 STA dispscr
 530 LDA #text% MOD 256
 540 STA text
 550 LDA #text% DIV 256
 560 STA text+1
 570 LDA #sins% MOD 256
 580 STA sins
 590 LDA #sins% DIV 256
 600 STA sins+1
 610 LDA #0
 620 STA time
 630 .resetx
 640 LDA #16
 650 STA xbase
 660 .wave
 670 LDX pokescr
 680 LDY dispscr
 690 STX dispscr
 700 STY pokescr
 710 LDA #19
 720 LDX #0
 730 LDY #0
 740 JSR osbyte
 750 LDA #13
 760 LDX #0
 770 STA &FE00
 780 STX &FE01
 790 LDA dispscr
 800 LSR A
 810 LSR A
 820 LSR A
 830 TAX
 840 LDA #12
 850 STA &FE00
 860 STX &FE01
 870 LDA pokescr
 880 CMP #screen2 DIV 256
 890 BEQ clear2
 900 LDA #0
 910 TAY
 920 .cls1loop
 930 ]
 940 FOR mem=0 TO &1F
 950 [OPT pass
 960 STA mem*256+screen1,Y
 970 ]NEXT
 980 [OPT pass
 990 DEY
 1000 BNE cls1loop
 1010 BEQ cleared
 1020 .clear2
 1030 LDA #0
 1040 TAY
 1050 .cls2loop
 1060 ]
 1070 FOR mem=0 TO &1F
 1080 [OPT pass
```

```
1090 STA mem*256+screen2,Y
1100 ]NEXT
1110 [OPT pass
1120 DEY
1130 BNE cls2loop
1140 .cleared
1150 LDA text
1160 STA text2
1170 LDA text+1
1180 STA text2+1
1190 LDY #0
1200 STY tptr
1210 LDA (text2),Y
1220 CMP #1
1230 BCC newscroll
1240 BNE samespeed
1250 LDA xbase
1260 CMP #16
1270 BNE ignoresin
1280 INY
1290 LDA (text2),Y
1300 STA sinspeed
1310 .ignoresin
1320 LDY #2
1330 BNE newtptr
1340 .newscroll
1350 LDA time
1360 BNE ignorespeed
1370 LDA xbase
1380 CMP #16
1390 BNE ignorespeed
1400 INY
1410 LDA scroll
1420 STA oscroll
1430 LDA (text2),Y
1440 STA scroll
1450 INY
1460 LDA (text2),Y
1470 STA time
1480 BNE forsometime
1490 LDA scroll
1500 STA oscroll
1510 .forsometime
1520 .ignorespeed
1530 LDY #3
1540 .newtptr
1550 STY tptr
1560 .samespeed
1570 LDA xbase
1580 STA xpos
1590 .plotstr
1600 LDY tptr
1610 LDA (text2),Y
1620 CMP #32
1630 BCS isascii
1640 CMP #4
1650 BNE noteot
1660 LDA #text% MOD 256
1670 STA text2
1680 LDA #text% DIV 256
1690 STA text2+1
1700 LDY #0
1710 STY tptr
1720 BEQ plotstr
1730 .noteot
1740 INC tptr
1750 CMP #2
1760 BCS plotstr
1770 INC tptr
1780 CMP #1
1790 BEQ plotstr
1800 INC tptr
1810 JMP plotstr
1820 .isascii
1830 PHA
1840 LDY xpos
1850 LDA (sins),Y
1860 TAY
1870 LDX xpos
1880 PLA
1890 JSR char
1900 INC tptr
1910 LDA xpos
1920 CLC
1930 ADC #16
1940 STA xpos
1950 BCC plotstr
1960 LDA sins
1970 SEC
1980 SBC sinspeed
1990 STA sins
2000 BCS sinsok
2010 DEC sins+1
2020 LDA sins+1
2030 CMP #sins% DIV 256
2040 BCS sinsok
2050 ADC #(angles-256) DIV 256
2060 STA sins+1
2070 .sinsok
2080 BIT &FF
2090 BMI exit
2100 LDA time
2110 BEQ nodelay
2120 DEC time
2130 BNE nodelay
2140 LDA oscroll
2150 STA scroll
2160 .nodelay
2170 LDA xbase
2180 SEC
2190 SBC scroll
2200 STA xbase
2210 BEQ nextchar
2220 JMP wave
2230 .nextchar
2240 LDX #1
2250 LDY #0
2260 LDA (text),Y
2270 CMP #1
2280 BCC null3
2290 BNE addtext
2300 LDX #2+1
2310 BNE addtext
2320 .null3
2330 LDX #3+1
2340 .addtext
2350 TXA
2360 CLC
2370 ADC text
2380 STA text
2390 BCC textnothi
2400 INC text+1
2410 .textnothi
2420 LDY #0
2430 LDA (text),Y
2440 CMP #4
2450 BNE moretext
2460 LDA #text% MOD 256
2470 STA text
2480 LDA #text% DIV 256
2490 STA text+1
2500 .moretext
2510 JMP resetx
2520 .exit
2530 RTS
2540 :
2550 .char
2560 PHA
2570 TXA
2580 AND #7
2590 STA xmod8
2600 TYA
2610 AND #7
2620 STA yoff
2630 TXA
2640 AND #&F8
2650 ORA yoff
2660 STA yoff
2670 LDA #0
2680 STA write
2690 TYA
2700 LSR A
2710 LSR A
2720 LSR A
2730 CLC
2740 ADC pokescr
2750 STA write+1
2760 PLA
2770 SEC
2780 SBC #ASC" "
2790 TAY
2800 LDA charlo,Y
2810 STA read
2820 LDA charhi,Y
2830 STA read+1
2840 LDA #0
2850 STA line
2860 .perline
2870 LDA line
2880 ASL A
2890 TAY
2900 LDA (read),Y
2910 STA bytes
2920 INY
2930 LDA (read),Y
2940 STA bytes+1
2950 LDA #0
2960 STA bytes+2
2970 LDX xmod8
2980 BEQ shifted
2990 .shiftr
3000 LSR bytes
3010 ROR bytes+1
3020 ROR bytes+2
3030 DEX
3040 BNE shiftr
3050 .shifted
3060 LDY yoff
3070 CPY #16
3080 BCC offl1
3090 LDA (write),Y
3100 ORA bytes
3110 STA (write),Y
3120 .offl1
3130 TYA
3140 CLC
3150 ADC #8
3160 TAY
3170 BCS offr
3180 CPY #16
3190 BCC offl2
3200 LDA (write),Y
3210 ORA bytes+1
3220 STA (write),Y
3230 .offl2
3240 TYA
3250 CLC
3260 ADC #8
3270 TAY
3280 BCS offr
3290 LDA bytes+2
3300 STA (write),Y
3310 .offr
3320 INC line
3330 LDA line
3340 CMP #16
3350 BEQ chardone
3360 INC yoff
3370 LDA yoff
3380 AND #7
3390 BNE perline
3400 LDA yoff
3410 SEC
3420 SBC #8
3430 STA yoff
3440 INC write+1
3450 JMP perline
3460 .chardone
3470 RTS
3480 ]
3490 charlo=FNmem(chars)
3500 charhi=FNmem(chars)
3510 NEXT
3520 FOR i=0 TO chars-1
3530 charlo?i=(chars%+i*32) MOD 256
3540 charhi?i=(chars%+i*32) DIV 256
3550 NEXT
3560 OSCLI"Load Font8 "+STR$~chars%
3570 OSCLI"Load Sintab "+STR$~sins%
3580 OSCLI"Load Text8 "+STR$~text%
3590 ENDPROC
3600 :
3610 DEF FNzp(n)
3620 zp=zp+n
3630 =zp-n
3640 :
3650 DEF FNmem(n)
3660 P%=P%+n
3670 =P%-n
3680 :
3690 DEF FNsizeof(f$)
3700 LOCAL f,e
3710 f=OPENIN(f$)
3720 e=EXT#f
3730 CLOSE#f
3740 =e
```

Sequel

Listing 1

```
   10 REM Sequel (Seq1)
   20 REM by Mike Smith
   30 REM for BBC B/B+/M/C
   40 REM (c) BAU Aug 91
   50 :
   60 *TV255,1
   70 MODE7
   80 PRINTCHR$141;CHR$132;CHR$157;CHR$1
31;SPC(4);"BASS/DRUM/NOTE Sequencer";SPC
(4)
   90 PRINTCHR$141;CHR$132;CHR$157;CHR$1
31;SPC(4);"BASS/DRUM/NOTE Sequencer";SPC
(4)
  100 *FX225,200
  110 *FX226,210
  120 *FX227,220
  130 *FX228,230
  140 DIM ch%(3),ins%(3),tran%(3),dur%(3
),pitch%(9,16,3),env%(9,16,3),ins$(14),e
%(14,12),pat 650,kb 1024,kc 26,hc 8
  150 Keyboard$="/:"+CHR$9+"1q2we4r5t6yu
8i9op-@^[\_":Drum$="/:HMLDCB"
  160 Note$=" / : c c#d d#e f f#g g#a a#
b C C#D D#E F F#G G#A A#B ":Hit$=" / : H
 M L D C B "
  170 FOR P%=1 TO 9:FOR B%=1 TO 16:FOR C
%=0 TO 3
  180 pitch%(P%,B%,C%)=1:env%(P%,B%,C%)=
0
  190 NEXT,,
  200 FOR T%=0 TO 9:pat?T%=1:pat?(T%+1)=
1:NEXT
  210 RESTORE 220:i%=0:REPEAT i%=i%+1:RE
AD kc?i%:UNTIL i%=26
  220 DATA 105,73,97,49,17,50,34,35,19,5
2,20,36,53,69,54,22,38,39,55,56,24,72,25
,57,121,41
  230 RESTORE 240:i%=0:REPEAT i%=i%+1:RE
AD hc?i%:UNTIL i%=8
  240 DATA 105,73,85,102,87,51,83,101
  250 B%=1:M%=1:P%=1:Q%=1024:R%=0:T%=0:Z
%=1:max%=16:tempo%=16:vol%=16:Tran%=0:li
%=1:lt%=0:lp%=1:lb%=1:le%=0
  260 FOR C%=0 TO 3:ch%(C%)=1:tran%(C%)=
0:ins%(C%)=1:dur%(C%)=20:NEXT
  270 PROCdefaultinstruments:PROCenvelop
es
  280 ON ERROR GOTO 1470
  290 VDU28,0,24,39,3,23,1,0;0;0;0;
  300 *FX202,32
  310 *FX4,0
  320 :
  330 CLS:PRINTCHR$129;"      MENU:  Ent
er selection..."'
  340 PRINTCHR$134;"<Q>  ";CHR$131;"Quit
 program"
  350 PRINTCHR$134;"<B>  ";CHR$131;"Bass
 sequence"
  360 PRINTCHR$134;"<D>  ";CHR$131;"Drum
 sequence"
  370 PRINTCHR$134;"<T>  ";CHR$131;"Trac
k sequence"
  380 PRINTCHR$134;"<K>  ";CHR$131;"Keyb
oard"
  390 PRINTCHR$134;"<L>  ";CHR$131;"Load
"
  400 PRINTCHR$134;"<S>  ";CHR$131;"Save
"
  410 PRINTCHR$134;"<I>  ";CHR$131;"defa
ult Instruments"
  420 PRINT'CHR$129;"<ESCAPE> to return
to Menu"
  430 PRINT'CHR$134;"<fkey>+<SHIFT>+<CTR
L> ";CHR$131;"Instruments"
  440 PRINTCHR$134;"<fkey>+<CTRL>
 ";CHR$131;"Channels on/off"
  450 PRINTCHR$134;"<fkey>+<SHIFT>
 ";CHR$131;"Patterns"
  460 PRINTCHR$134;"<fkey>
 ";CHR$131;"Tracks"
  470 :
  480 REPEAT k$=GET$
  490 IF k$="B" C%=1:lc%=1:D%=0:G%=0:P%=
1:lp%=1:PROCplay
  500 IF k$="D" C%=0:lc%=0:D%=1:G%=0:P%=
1:lp%=1:PROCplay
  510 IF k$="T" PROCedit
  520 IF k$="K" A%=0:C%=3:G%=1:K%=0:P%=0
:lp%=0:R%=0:PROCpat:PROCplay
  530 IF k$="L" PROCload
  540 IF k$="S" PROCsave
  550 IF k$="I" PROCdefaultinstruments
  560 UNTIL k$="Q"
  570 :
  580 VDU26,12,23,1,1;0;0;0;
  590 *FX4,0
  600 *FX12,0
  610 *FX225,1
  620 END
  630 :
  640 DEF PROCplaymenu
  650 *FX202,48
  660 X%=0:Y%=0:VDU28,0,24,39,3,12
  670 PRINTCHR$134;"<,.>  ";CHR$131;"tem
po    ";CHR$129;tempo%;TAB(22,0)CHR$134;
"<dh>  ";CHR$131;"transpose"
  680 PRINTCHR$134;"<<>>  ";CHR$131;"bea
ts/bar";CHR$129;max%;TAB(22,1)CHR$134;"<
SPC> ";:IF Z% PRINTCHR$129;"start" ELSE
PRINTCHR$131;"stop"
  690 PRINTCHR$134;"<nm>  ";CHR$131;"sus
tain  "TAB(22,2)CHR$134;"<CPY>";CHR$131;
" env";CHR$134;"SH";CHR$131;"pat";
  700 PRINTCHR$134;"<sl>  ";CHR$131;"lou
dness ";CHR$129;128-vol%;TAB(22,3)CHR$13
4;"<*>   ";CHR$131;"accent/off"
  710 IF G% PROCkeymenu ELSE PROCseqmenu
  720 PRINTTAB(0,15)CHR$133;"PATTNS"'CHR
$133;:IF P%=0 PRINT"track";T% ELSE PRINT
  730 PRINTCHR$135;:FOR i%=0 TO 9:PRINTi
ns$(i%);" ";:NEXT
  740 FOR c%=0 TO 3:PRINTTAB(c%*4,18)CHR
$(129+ch%(c%));"c";STR$(c%);:NEXT:PRINTT
AB(23,18)CHR$(130-R%);"STEP   ";CHR$(129
+R%);"REAL"
  750 PRINTTAB(0,19)CHR$134;"t0  t1  t2
 t3  t4  t5  t6  t7  t8  t9":PRINTTAB(T%
*4,19)CHR$129;:IF T%<>9 PRINTTAB(T%*4+4,
19)CHR$134;
  760 PRINTTAB(0,20)CHR$131;"SEQ p1  p2
 p3  p4  p5  p6  p7  p8  p9":PRINTTAB(P%
*4,20)CHR$129;:IF P%<>9 PRINTTAB(P%*4+4,
20)CHR$131;
  770 PRINTTAB(0,21)CHR$129;"f0  f1  f2
 f3  f4  f5  f6  f7  f8  f9";
  780 IF G%=0 PROCpat:X%=0
  790 VDU28,8,19,39,18,31,X%,Y%
  800 ENDPROC
  810 :
  820 DEF PROCseqmenu
  830 PRINTCHR$130;"BEATS  1 2 3 4 5 6 7
 8 9 10111213141516";
  840 PRINTCHR$134;"<[]>";CHR$145:PRINTT
AB(6+B%*2,6)"//"
  850 PRINTCHR$134;"c3";ins$(ins%(3))
  860 PRINTCHR$134;dur%(3)TAB(5,8);tran%
(3)DIV48
  870 PRINTCHR$134;"c2";ins$(ins%(2))
```

```
 880 PRINTCHR$134;dur%(2)TAB(5,10);tran
%(2)DIV48
 890 PRINTCHR$134;"c1";:IF D% PRINTins$
(ins%(1))ELSE PRINT"bss"
 900 PRINTCHR$134;:PRINT;dur%(1);:IF D%
 PRINTTAB(5,12);tran%(1)DIV48 ELSE PRINT
TAB(5,12);tran%(1)DIV48-2
 910 IF D% PRINTCHR$134;"c0drm"'CHR$134
;dur%(0)
 920 PRINTTAB(0,13-C%*2)CHR$131TAB(0,14
-C%*2)CHR$131
 930 ENDPROC
 940 :
 950 DEF PROCkeymenu
 960 PRINT CHR$130;"KEYBOARD  ";ins$(in
s%(3))TAB(16,5);dur%(3)TAB(20,5);tran%(3
)DIV48
 970 PRINT'CHR$134;"<a>";CHR$(131+2*(A%
=0));"play ";CHR$134;"<j>";CHR$(131+2*(A
%=1));"record ";CHR$134;"<k>";CHR$(131+2
*(A%=2))"replay/edit"
 980 PRINTTAB(22,9)CHR$134;"<c>";CHR$13
1"start)"TAB(22,10)CHR$134;"<v>";CHR$131
;"end  ) loop"TAB(22,11)CHR$134;"<x>";CH
R$131;"exit )"
 990 PRINTTAB(4,13)CHR$131;"note ";CHR$
135;"      ";CHR$131;"beat ";CHR$134;"<[]
> <^v> ";CHR$131;"step"
 1000 IF Z% PRINTTAB(1,13)MID$(Note$,N%*
2,2)TAB(11,13);K%;"  "
 1010 ENDPROC
 1020 :
 1030 DEF PROCplay
 1040 pn%=0
 1050 CLS:PROCplaymenu:*FX4,1
 1060 REPEAT pn%=pn%MODM%+1
 1070 IF P% pattern%=P% ELSE pattern%=pa
t?(T%*64+pn%)
 1080 PRINT;pattern%;" ";:PROCbar
 1090 UNTIL FALSE
 1100 ENDPROC
 1110 :
 1120 DEF PROCbar
 1130 n%=0
 1140 REPEAT n%=n%+1:K%=K%MODQ%+1
 1150 REPEAT PROCpar(INKEY(0)):UNTIL Z%=
0
 1160 REPEAT UNTIL TIME>=tempo%:TIME=0
 1170 IF D% AND ch%(0) PROCdrum(pattern%
,n%)
 1180 IF ch%(1) AND D%=0 PROCbass(patter
n%,n%) ELSE IF ch%(1) PROCnote(pattern%,
n%,1)
 1190 IF ch%(2) PROCnote(pattern%,n%,2)
 1200 IF ch%(3) AND G%=0 PROCnote(patter
n%,n%,3)
 1210 UNTIL n%>=max%
 1220 ENDPROC
 1230 :
 1240 DEF PROCnote(pat%,b%,ch%)
 1250 LOCAL p%:p%=pitch%(pat%,b%,ch%)
 1260 IF p%=1 ENDPROC
 1270 IF p%=2 SOUND &10+ch%,0,0,0:ENDPRO
C
 1280 SOUND &10+ch%,env%(pat%,b%,ch%)+8+
ch%*2,p%+Tran%,dur%(ch%)
 1290 ENDPROC
 1300 :
 1310 DEF PROCbass(pat%,b%)
 1320 LOCAL p%:p%=pitch%(pat%,b%,1)
 1330 IF p%=1 ENDPROC
 1340 IF p%=2 SOUND &10,0,0,0:ENDPROC
 1350 SOUND &10,env%(pat%,b%,1)+8,3,dur%
(1)
 1360 SOUND &11,7,p%+91+Tran%,dur%(1)
 1370 ENDPROC
 1380 :
 1390 DEF PROCdrum(pat%,b%)
 1400 LOCAL e%,p%:e%=env%(pat%,b%,0):p%=
pitch%(pat%,b%,0)
 1410 IF p%=1 ENDPROC
 1420 IF p%=2 SOUND &10,0,0,0:ENDPROC
 1430 IF p%<6 e%=e%+1:p%=p%+1 ELSE IF p%
=6 e%=e%+1:p%=2 ELSE IF p%=7 e%=e%+3:p%=
4 ELSE IF p%=8 e%=e%+5:p%=5
 1440 SOUND &10,e%,p%,dur%(0)
 1450 ENDPROC
 1460 :
 1470 ON ERROR OFF
 1480 IF ERR<>17 REPORT:PRINT" at line "
;ERL:CLOSE#0:PRINTCHR$129;"PRESS ANY KEY
 TO CONTINUE";:k%=GET
 1490 IF ERR=17 AND A%=1 Q%=K%+max%-n%-1
:REPEAT K%=K%+1:kb?K%=1:UNTILK%>=Q%
 1500 IF ERR=17 V%=0:Z%=1:*FX12,0
 1510 GOTO 280
 1520 :
 1530 DEF PROCpar(k%)
 1540 LOCAL k$:k$=CHR$k%
 1550 IF G% AND Z%=0 PROCkeyboard(k$)
 1560 X%=POS:Y%=VPOS:VDU28,0,24,39,3
 1570 IF R%=1 AND G%=0 PROCrealtime(k$)
ELSE IF G%=0 PROCkbd(k$)
 1580 IF k%=135 AND INKEY(-1) PROCcopypa
t:k%=-1
 1590 IF k%=-1 VDU28,8,19,39,18,31,X%,Y%
:ENDPROC
 1600 IF k%=135 V%=(V%+1)MOD2:IF V%=0 PR
OCplaymenu:ENDPROC ELSE IF k%=135 le%=0:
PROCenvmenu:ENDPROC
 1610 IF k%=135 V%=(V%+1)MOD2:IF V%=0 PR
OCplaymenu:ENDPROC ELSE IF k%=135 le%=0:
PROCenvmenu:ENDPROC
 1620 IF V% PROCvaryenv(k%):ENDPROC
 1630 IF k%=32 Z%=(Z%+1)MOD2:IF Z% PRINT
TAB(29,1)CHR$129;"start" ELSE IF k%=32 P
RINTTAB(29,1)CHR$131;"stop ":IF G% PRINT
TAB(1,13)"  "TAB(11,13)"   "
 1640 IF Z%=0 THEN *FX11,0
 1650 IF Z%=1 THEN *FX12,0
 1660 IF k%>229 AND C%>1-D% PROCinstrume
nt(k%-230)
 1670 IF k%>219 AND k%<224 PROCch(k%-220
)
 1680 IF k%=226 R%=0:PRINTTAB(23,18)CHR$
130;TAB(31,18)CHR$129
 1690 IF k%=228 AND G%=0 R%=1:PRINTTAB(2
3,18)CHR$129;TAB(31,18)CHR$130:*FX21
 1700 IF k%>209 AND k%<220 T%=k%-210:PRO
Ctrack
 1710 IF k%>135 AND k%<140 AND G% AND Z%
 PROCkcursor(k%)
 1720 IF INSTR(".,",k$) PROCtempo(k$)
 1730 IF INSTR("<>",k$) PROCmax(k$)
 1740 IF INSTR("nm",k$) PROCdur(k$)
 1750 IF INSTR("sl",k$) PROCvol(k$)
 1760 IF INSTR("dh",k$) PROCtran(k$)
 1770 IF G%=1 AND INSTR("ajkcv",k$) PROC
kbpar(k$)
 1780 IF G% AND Z% PROCkeyboard(k$):PRIN
TTAB(1,13)MID$(Note$,N%*2,2)TAB(11,13);K
%;"  "
 1790 IF G% VDU28,8,19,39,18,31,X%,Y%:EN
DPROC
 1800 IF k%>199 AND k%<210 P%=k%-200:PRO
Cpat
 1810 IF k$="*" PROCaccent
 1820 IF k%=127 pitch%(P%,B%-1,C%)=2:PRI
NTTAB(4+B%*2,13-C%*2)": ":k%=136
 1830 IF k%>135 AND k%<140 PROCcursor(k%
)
 1840 VDU28,8,19,39,18,31,X%,Y%
 1850 ENDPROC
 1860 :
 1870 DEF PROCcursor(k%)
 1880 IF k%=136 B%=B%-1:IF B%<1 B%=max%
 1890 IF k%=137 B%=B%+1:IF B%>max% B%=1
 1900 PRINTTAB(6+lb%*2,6)"  "TAB(6+B%*2,
6)"//":lb%=B%
 1910 IF R% n%=B%
 1920 IF k%=138 C%=C%-1:IF C%<1-D% C%=3
 1930 IF k%=139 C%=C%+1:IF C%>3 C%=1-D%
 1940 PRINTTAB(0,13-lc%*2)CHR$134TAB(0,1
4-lc%*2)CHR$134:PRINTTAB(0,13-C%*2)CHR$1
31TAB(0,14-C%*2)CHR$131:lc%=C%
 1950 ENDPROC
 1960 :
 1970 DEF PROCkcursor(k%)
 1980 IF k%=136 K%=K%-1
 1990 IF k%=138 K%=K%-10
 2000 IF k%=137 K%=K%+1
 2010 IF k%=139 K%=K%+10
 2020 IF K%<1 K%=Q%
 2030 IF K%>Q% K%=1
 2040 ENDPROC
 2050 :
 2060 DEF PROCtempo(t$)
 2070 IF t$="," tempo%=tempo%-1:IF tempo
%<1 tempo%=1
 2080 IF t$="." tempo%=tempo%+1
 2090 PRINTTAB(18,0);tempo%;"  "
 2100 ENDPROC
 2110 :
 2120 DEF PROCdur(d$)
 2130 IF d$="n" dur%(C%)=dur%(C%)-1:IF d
ur%(C%)<-1 dur%(C%)=-1
 2140 IF d$="m" dur%(C%)=dur%(C%)+1:IF d
ur%(C%)>255 dur%(C%)=255
 2150 PRINTTAB(1+G%*15,14-C%*2-G%*3);dur
%(C%);" "
 2160 ENDPROC
 2170 :
 2180 DEF PROCvol(v$)
 2190 IF v$="s" vol%=vol%+8:IF vol%>128
vol%=128
 2200 IF v$="l" vol%=vol%-8:IF vol%<0 vo
l%=0
 2210 PRINTTAB(18,3);128-vol%;" "
 2220 FOR i%=0 TO 2:PROCenv(i%+10,i%*2+1
):PROCenv(ins%(i%+1),i%*2+10):NEXT:PROCe
nv(14,8)
 2230 ENDPROC
 2240 :
 2250 DEF PROCmax(m$)
 2260 IF m$="<" max%=max%-1:IF max%<1 ma
x%=1
 2270 IF m$=">" max%=max%+1:IF max%>16 m
ax%=16
 2280 PRINTTAB(18,1);max%;"  "
 2290 ENDPROC
 2300 :
 2310 DEF PROCtran(t$)
 2320 IF t$="d" tran%(C%)=tran%(C%)-48:I
F tran%(C%)<0 tran%(C%)=0
 2330 IF t$="h" tran%(C%)=tran%(C%)+48:I
F tran%(C%)>144 tran%(C%)=144
 2340 IF C% PRINTTAB(5+G%*15,14-C%*2-G%*
3);tran%(C%)DIV48+2*(C%=1 AND D%=0);" "
 2350 ENDPROC
 2360 :
 2370 DEF PROCkbd(k$)
 2380 IF C% N%=INSTR(Keyboard$,k$) ELSE
N%=INSTR(Drum$,k$)
 2390 IF N%=0 ENDPROC
 2400 IF P%=0 Tran%=(N%-3)*4:ENDPROC
 2410 IF C% PRINTTAB(6+B%*2,13-C%*2)MID$
(Note$,N%*2,2) ELSE PRINTTAB(6+B%*2,13)M
ID$(Hit$,N%*2,2)
 2420 IF N%<3 pitch%(P%,B%,C%)=N% ELSE I
F C% pitch%(P%,B%,C%)=(N%-2)*4+tran%(C%)
 ELSE pitch%(P%,B%,0)=N%
 2430 k%=137
 2440 ENDPROC
 2450 :
 2460 DEF PROCrealtime(k$)
 2470 IF C% N%=INSTR(Keyboard$,k$) ELSE
N%=INSTR(Drum$,k$)
 2480 IF N% THEN *FX21,0
 2490 IF N%>0 AND C%>0 L%=kc?N% ELSE IF
N%>0 L%=hc?N% ELSE N%=-INKEY(-L%)
 2500 IF N%=0 ENDPROC
 2510 IF C% PRINTTAB(6+n%*2,13-C%*2)MID$
(Note$,N%*2,2) ELSE PRINTTAB(6+n%*2,13)M
ID$(Hit$,N%*2,2)
 2520 IF N%<3 pitch%(P%,n%,C%)=N% ELSE I
F C% pitch%(P%,n%,C%)=(N%-2)*4+tran%(C%)
 ELSE pitch%(P%,n%,C%)=N%
 2530 IF Z% k%=137
 2540 ENDPROC
 2550 :
 2560 DEF PROCkeyboard(k$)
 2570 N%=INSTR(Keyboard$,k$)
 2580 IF Z%>0 AND N%=0 AND A%=1 ENDPROC
 2590 IF N% THEN *FX21,0
 2600 IF N% L%=kc?N% ELSE N%=-INKEY(-L%)
 2610 IF A%=1 OR (A%=2 AND N%<>0) kb?K%=
N%
 2620 IF A%=2 N%=kb?K%
 2630 IF N%=0 SOUND &1013,0,0,-1:ENDPROC
 2640 IF N%=1 ENDPROC
 2650 IF N%=2 SOUND &13,0,0,-1:ENDPROC
 2660 SOUND &13,15,(N%-2)*4+tran%(3),-1
 2670 ENDPROC
 2680 :
 2690 DEF PROCkbpar(k$)
 2700 IF k$="a" A%=0:PRINTTAB(4,7)CHR$12
9TAB(14,7)CHR$131TAB(26,7)CHR$131
 2710 IF k$="j" A%=1:K%=1:Q%=512:n%=1:pn
%=1:PRINTTAB(4,7)CHR$131TAB(14,7)CHR$129
TAB(26,7)CHR$131
 2720 IF k$="k" AND Z%=0 AND A%=1 Q%=K%+
max%-n%-1:REPEAT K%=K%+1:kb?K%=1:UNTILK%
>=Q%:n%=1:pn%=1 ELSE IF k$="k" AND A%=1
Q%=K%
 2730 IF k$="k" A%=2:K%=1:PRINTTAB(4,7)C
HR$131TAB(14,7)CHR$131TAB(26,7)CHR$129
 2740 IF k$="c" AND A%=2 S%=K%:PRINTTAB(
33,10)CHR$129TAB(26,7)CHR$131
 2750 IF k$="v" AND A%=2 O%=K%:PROCloop
 2760 ENDPROC
 2770 :
 2780 DEF PROCaccent
 2790 env%(P%,B%,C%)=(env%(P%,B%,C%)+1)M
OD2
 2800 PRINTTAB(6+B%*2,14-C%*2)CHR$(32+10
*env%(P%,B%,C%))
 2810 ENDPROC
 2820 :
 2830 DEF PROCloop
 2840 REPEAT K%=S%-1
 2850 REPEAT K%=K%MODQ%+1
 2860 REPEAT UNTIL TIME>=tempo%:TIME=0
 2870 PROCkeyboard(CHR$(INKEY(0)))
 2880 UNTIL K%=O% OR INKEY(-67)
 2890 UNTIL INKEY(-67)
 2900 PRINTTAB(33,10)CHR$131TAB(26,7)CHR
$129
 2910 ENDPROC
 2920 :
 2930 DEF PROCslmenu
 2940 VDU23,1,1;0;0;0;
 2950 PRINTCHR$134;"<A>";CHR$131"All"
 2960 PRINTCHR$134;"<T>";CHR$131"Tracks"
 2970 PRINTCHR$134;"<P>";CHR$131"Pattern
s"
 2980 PRINTCHR$134;"<I>";CHR$131"Instrum
ents"
 2990 PRINTCHR$134;"<K>";CHR$131"Keyboar
d"
 3000 PRINTCHR$134;"<*>";CHR$131"O.S. Co
mmand"
 3010 VDU28,0,24,39,13,14
 3020 REPEAT:REPEAT D$=GET$:UNTIL INSTR(
"ATPI*",D$):IF D$="*" PROCos
 3030 UNTIL INSTR("ATPI",D$)
 3040 ENDPROC
 3050 :
 3060 DEF PROCos
 3070 REPEAT CLS:PRINTCHR$129;"Enter O.S
. command <RETURN> to continue":INPUT" *
"os$
 3080  OSCLI("*"+os$):IF os$<>"" k%=GET
 3090 UNTIL os$="":CLS
 3100 ENDPROC
 3110 :
 3120 DEF PROCsave
 3130 LOCAL b%,c%,i%,p%
 3140 CLS:PRINT'CHR$129;"Saving to disc.
.."'
 3150 PROCslmenu
 3160 REPEAT CLS:PRINT'CHR$131;"Enter fi
lename to save..."''" ";D$;".";
 3170 INPUT""name$:N%=OPENIN(D$+"."+name
$)
 3180 IF N%>0 PRINT'CHR$129;"File alread
y exists! OK? <Y/N>":k$=GET$
 3190 UNTIL N%=0 OR k$="Y" OR k$="y":CLO
SE#0:N%=OPENOUT(D$+"."+name$)
 3200 IF D$="A" PRINT#N%,tempo%,max%,vol
%,M%,T%:FOR i%=0 TO 3:PRINT#N%,ch%(i%),t
ran%(i%),ins%(i%),dur%(i%):NEXT
 3210 IF D$="T" OR D$="A" FOR b%=0 TO 65
0:BPUT#N%,pat?b%:NEXT
 3220 IF D$="P" OR D$="A" FOR p%=0 TO 9:
FOR b%=1 TO 16:FOR c%=0 TO 3:PRINT#N%,pi
tch%(p%,b%,c%),env%(p%,b%,c%):NEXT,,
 3230 IF D$="I" OR D$="A" FOR i%=1 TO 9:
PRINT#N%,ins$(i%):FOR p%=0 TO 12:PRINT#N
%,e%(i%,p%):NEXT:NEXT
 3240 IF D$="K" OR D$="A" PRINT#N%,Q%:FO
R b%=1 TO Q%:BPUT#N%,kb?b%:NEXT
 3250 CLOSE#0:VDU15:*FX125
 3260 ENDPROC
 3270 :
 3280 DEF PROCload
 3290 LOCAL b%,c%,i%,p%
 3300 CLS:PRINT'CHR$129;"Loading from di
sc..."'
 3310 PROCslmenu
 3320 REPEAT CLS:PRINT'CHR$131;"Enter fi
lename to load..."''" ";D$;".";
 3330 INPUT""name$:N%=OPENIN(D$+"."+name
$)
 3340 IF N%=0 PRINT'CHR$129;"No file on
disc! <RETURN> to continue":K%=GET
 3350 UNTIL N%>0
 3360 IF D$="A" INPUT#N%,tempo%,max%,vol
%,M%,T%:FOR i%=0 TO 3:INPUT#N%,ch%(i%),t
ran%(i%),ins%(i%),dur%(i%):NEXT
 3370 IF D$="T" OR D$="A" FOR b%=0 TO 65
0:pat?b%=BGET#N%:NEXT
 3380 IF D$="P" OR D$="A" FOR p%=0 TO 9:
FOR b%=1 TO 16:FOR c%=0 TO 3:INPUT#N%,pi
tch%(p%,b%,c%),env%(p%,b%,c%):NEXT,,
 3390 IF D$="I" OR D$="A" FOR i%=1 TO 9:
INPUT#N%,ins$(i%):FOR p%=0 TO 12:INPUT#N
%,e%(i%,p%):NEXT:NEXT:PROCenvelopes
 3400 IF D$="K" OR D$="A" INPUT#N%,Q%:FO
R b%=1 TO Q%:kb?b%=BGET#N%:NEXT
 3410 CLOSE#0:VDU15:*FX125
 3420 ENDPROC
 3430 :
 3440 DEF PROCch(c%)
 3450 IF ch%(c%) PRINTTAB(c%*4,18)CHR$12
9 ELSE PRINTTAB(c%*4,18)CHR$130
 3460 ch%(c%)=(ch%(c%)+1)MOD2
 3470 ENDPROC
 3480 :
 3490 DEF PROCpat
 3500 LOCAL b%,c%,p%:n%=1:PRINTTAB(8+X%,
15+Y%);P%:X%=(X%+2)MOD32:IF X%=0 Y%=(Y%+
1)MOD2
 3510 PRINTTAB(lp%*4,20)CHR$131;TAB(P%*4
,20)CHR$129;
 3520 IF P%<>9 PRINTTAB(P%*4+4,20)CHR$13
1;
 3530 lp%=P%
 3540 IF P% PRINTTAB(1,16)"       ":patte
rn%=P% ELSE PRINTTAB(1,16)"track";T%:pn%
=1:pattern%=pat?(T%*64+1):n%=1:K%=1:M%=p
at?T%:PRINTTAB(8,15)SPC(32)TAB(8,16)SPC(
32)TAB(8,15);pattern%:X%=2:Y%=0:ENDPROC
 3550 FOR c%=3 TO 1 STEP -1:FOR b%=1 TO
16
 3560 p%=pitch%(P%,b%,c%)
 3570 IF p%<3 PRINTTAB(6+b%*2,13-c%*2)MI
D$(Note$,p%*2,2)
 3580 IF p%>2 AND p%<100  PRINTTAB(6+b%*
2,13-c%*2)MID$(Note$,p%DIV2+4,2)
 3590 IF p%>96 AND p%<196 PRINTTAB(6+b%*
2,13-c%*2)MID$(Note$,(p%-96)DIV2+4,2)
 3600 IF p%>192 AND p%<244 PRINTTAB(6+b%
*2,13-c%*2)MID$(Note$,(p%-192)DIV2+4,2)
 3610 PRINTTAB(6+b%*2,14-c%*2)CHR$(32+10
*env%(P%,b%,c%))
 3620 NEXT,
 3630 IF D%=0 ENDPROC
 3640 FOR b%=1 TO 16
 3650 PRINTTAB(6+b%*2,13)MID$(Hit$,pitch
%(P%,b%,c%)*2,2)
 3660 PRINTTAB(6+b%*2,14)CHR$(32+10*env%
(P%,b%,0))
 3670 NEXT
 3680 ENDPROC
 3690 :
 3700 DEF PROCcopypat
 3710 LOCAL b%,c%,e%
 3720 PRINTTAB(8,15)SPC(32)TAB(8,16)SPC(
32)
 3730 INPUTTAB(8,15)"pattern to be copie
d? <1-9> "e%:IF e%=0 GOTO 3780
 3740 FOR c%=0 TO 3:FOR b%=1 TO 16
 3750 pitch%(P%,b%,c%)=pitch%(e%,b%,c%)
 3760 env%(P%,b%,c%)=env%(e%,b%,c%)
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3770 NEXT,
3780 PRINTTAB(8,15)SPC(32):X%=0:Y%=0:PROCpat
3790 ENDPROC
3800 :
3810 DEF PROCtrack
3820 PRINTTAB(lt%*4,19)CHR$134;TAB(T%*4,19)CHR$129;
3830 IF T%<>9 PRINTTAB(T%*4+4,19)CHR$134;
3840 lt%=T%
3850 IF P%=0 PRINTTAB(6,16);T%
3860 ENDPROC
3870 :
3880 DEF PROCinstrument(i%)
3890 ins%(C%)=i%:PRINTTAB(3+G%*8,13-C%*2-G%*2)ins$(i%)
3900 PRINTTAB(li%*4,17)CHR$135;TAB(i%*4,17)CHR$129;
3910 IF i%<>9 PRINTTAB(i%*4+4,17)CHR$135;
3920 li%=i%:PROCenv(i%,C%*2+8)
3930 ENDPROC
3940 :
3950 DEF PROCenv(i%,c%)
3960 ENVELOPE c%,e%(i%,0),e%(i%,1),e%(i%,2),e%(i%,3),e%(i%,4),e%(i%,5),e%(i%,6),e%(i%,7),e%(i%,8),e%(i%,9),e%(i%,10),e%(i%,11)-vol%,e%(i%,12)-vol%
3970 IF c%=7 ENDPROC
3980 ENVELOPE c%+1,e%(i%,0),e%(i%,1),e%(i%,2),e%(i%,3),e%(i%,4),e%(i%,5),e%(i%,6),e%(i%,7),e%(i%,8),e%(i%,9),e%(i%,10),e%(i%,11),e%(i%,12)
3990 ENDPROC
4000 :
4010 DEF PROCdefaultinstruments
4020 LOCAL i%,p%
4030 RESTORE 4090
4040 FOR i%=0 TO 14
4050 READ ins$(i%)
4060 FOR p%=0 TO 12
4070 READ e%(i%,p%)
4080 NEXT:NEXT
4090 DATA squ,1,0,0,0,0,0,0,80,0,0,-80,80,80
4100 DATA syn,6,-1,1,-1,1,1,1,120,-5,0,-10,120,80
4110 DATA pno,5,0,0,0,0,0,0,120,-5,-2,-20,120,80
4120 DATA eco,12,0,8,12,1,1,1,120,-8,-1,-10,120,80
4130 DATA pan,1,0,1,-2,1,1,1,20,-3,0,-5,120,80
4140 DATA vib,8,-1,1,-1,1,1,1,126,-8,-4,-4,120,80
4150 DATA org,1,0,0,0,0,0,0,10,5,0,-20,80,100
4160 DATA ham,4,-1,1,-1,1,1,1,20,10,0,-30,80,100
4170 DATA wnd,1,0,0,0,0,0,0,50,0,0,-15,100,100
4180 DATA str,8,-1,1,-1,1,1,1,10,5,0,-5,80,100
4190 DATA Drm,1,0,0,0,0,0,0,126,-10,-5,-5,126,104
4200 DATA Cym,1,0,0,0,0,0,0,126,-10,-1,-1,126,104
4210 DATA Bsh,1,0,0,0,0,0,0,10,-2,0,-1,100,60
4220 DATA Bss,1,0,0,0,0,0,0,0,0,0,0,0,0
4230 DATA Bss,1,0,0,0,0,0,0,126,-8,-1,-1,126,104
4240 ENDPROC
4250 :
4260 DEF PROCenvelopes
4270 FOR e%=1 TO 7 STEP 2:PROCenv((e%+1)DIV2+9,e%):NEXT:PROCenv(14,8)
4280 FOR e%=10 TO 14 STEP 2:PROCenv(ins%(e%DIV2-4),e%):NEXT
4290 ENDPROC
4300 :
4310 DEF PROCedit
4320 LOCAL c%,lc%:c%=M%:lc%=M%
4330 CLS:PRINTCHR$129;"Editing Patterns on Track ";T%":"'
4340 PRINTCHR$134;"<fkey>+<SHIFT>";CHR$131;"change Track"
4350 PRINTCHR$134;"<N>   ";CHR$131;"New sequence"
4360 PRINTCHR$134;"<0-9> ";CHR$131;"enter or change Pattern"
4370 PRINTCHR$134;"<COPY>";CHR$131;"insert Pattern"
4380 PRINTCHR$134;"<DEL> ";CHR$131;"delete Pattern"
4390 PRINTCHR$134;"<[ ]> ";CHR$131;"select Pattern to edit"
4400 *FX4,1
4410 VDU28,7,18,38,12:PROCprintpats
4420 VDU23,1,1;0;0;0;
4430 REPEAT k%=GET:k$=CHR$k%
4440 IF k%=78 pat?T%=1:pat?(T%+1)=1:M%=1:c%=1:lc%=1:PROCprintpats
4450 IF k%=136 c%=c%-1:IF c%<1 c%=1
4460 IF k%=137 c%=c%+1:IF c%>M%+1 c%=M%+1
4470 IF k%=138 c%=c%+16:IF c%>M% c%=M%
4480 IF k%=139 c%=c%-16:IF c%<1 c%=1
4490 IF k%>209 AND k%<220 T%=k%-210:M%=pat?T%:PROCprintpats:PRINTTAB(27,0);T%;
4500 IF k%>48 AND k%<58 AND M%<65 pat?(T%+c%)=k%-48:PRINTSTR$(k%-48);" ":IF c%=M%+1 AND M%<64 pat?T%=c%:M%=c%:c%=c%+1
4510 IF k%=127 AND M%>1 PROCdeletepat
4520 IF k%=135 AND M%<64 PROCinsertpat
4530 PROChighlight
4540 UNTIL FALSE
4550 ENDPROC
4560 :
4570 DEF PROCdeletepat
4580 IF c%<M% FOR i%=c% TO M%-1:pat?(T%+i%)=pat?(T%+i%+1):NEXT ELSE c%=c%-1
4590 M%=M%-1:pat?T%=M%:PROCprintpats
4600 ENDPROC
4610 :
4620 DEF PROCinsertpat
4630 FOR i%=M% TO c%+1 STEP -1:pat?(T%+i%)=pat?(T%+i%-1):NEXT
4640 M%=M%+1:pat?T%=M%:PROCprintpats
4650 ENDPROC
4660 :
4670 DEF PROCprintpats
4680 CLS:FOR i%=1 TO M%:IF pat?(T%+i%) PRINTTAB(((i%-1)MOD16)*2+1,(i%-1)DIV16);pat?(T%+i%);:NEXT
4690 VDU31,((c%-1)MOD16)*2+1,(c%-1)DIV16
4700 ENDPROC
4710 :
4720 DEF PROChighlight
4730 PRINTTAB(((lc%-1)MOD16)*2,(lc%-1)DIV16)CHR$135;
4740 PRINTTAB(((c%-1)MOD16)*2,(c%-1)DIV16)CHR$129;
4750 IF ((c%-1)MOD16)*2+2<31 PRINTTAB(((c%-1)MOD16)*2+2,(c%-1)DIV16)CHR$135;
4760 lc%=c%
4770 VDU31,((c%-1)MOD16)*2+1,(c%-1)DIV16
4780 ENDPROC
4790 :
4800 DEF PROCenvmenu
4810 X%=POS:Y%=VPOS:VDU28,0,17,39,3,12
4820 IF C%>1-D% I%=ins%(C%)
4830 IF C%=1 AND D%=0 I%=13
4840 IF C%=0 AND D%=1 REPEAT INPUT"Which envelope?"''"<D>rum"'"<C>ymbal"'"<B>rush"'I$:I%=INSTR("DCB",I$)+9:UNTIL I%>9
4850 CLS:PRINTCHR$135;ins$(I%);CHR$129"<^v> parameter <[]> value"
4860 PRINTCHR$131;"time unit         ";CHR$134;e%(I%,0)
4870 PRINTCHR$131;"pitch increase 1 ";CHR$134;e%(I%,1)
4880 PRINTCHR$131;"pitch increase 2 ";CHR$134;e%(I%,2)
4890 PRINTCHR$131;"pitch increase 3 ";CHR$134;e%(I%,3)
4900 PRINTCHR$131;"pitch number   1 ";CHR$134;e%(I%,4)
4910 PRINTCHR$131;"pitch number   2 ";CHR$134;e%(I%,5)
4920 PRINTCHR$131;"pitch number   3 ";CHR$134;e%(I%,6)
4930 IF C%=1 AND D%=0 I%=I%+1
4940 PRINTCHR$131;"attack           ";CHR$134;e%(I%,7)
4950 PRINTCHR$131;"decay            ";CHR$134;e%(I%,8)
4960 PRINTCHR$131;"sustain          ";CHR$134;e%(I%,9)
4970 PRINTCHR$131;"release          ";CHR$134;e%(I%,10)
4980 PRINTCHR$131;"attack level     ";CHR$134;e%(I%,11)
4990 PRINTCHR$131;"decay level      ";CHR$134;e%(I%,12);
5000 IF C%=1 AND D%=0 I%=I%-1
5010 PRINTTAB(25,le%+1)CHR$129;CHR$157;CHR$135;e%(I%,le%);
5020 VDU28,8,19,39,18,31,X%,Y%
5030 ENDPROC
5040 :
5050 DEF PROCvaryenv(k%)
5060 IF k%<135 ENDPROC
5070 LOCAL x%,y%,p%:p%=le%
5080 X%=POS:Y%=VPOS:VDU28,0,24,39,3
5090 IF k%>229 x%=X%:y%=Y%:PROCenvmenu:VDU28,0,24,39,2:X%=x%:Y%=y%:PRINTTAB(1,1)ins$(I%):VDU23,1,1;0;0;0;:INPUTTAB(I%*4+1,18)""in$:VDU23,1,0;0;0;0;:IF in$<>"" ins$(I%)=LEFT$(in$,3):PRINTTAB(1,1)ins$(I%):GOTO 5210 ELSE IF k%>229 GOTO 5210
5100 IF k%=136 e%(I%,p%)=e%(I%,p%)-1+9*INKEY(-1)
5110 IF k%=137 e%(I%,p%)=e%(I%,p%)+1-9*INKEY(-1)
5120 IF k%=138 p%=p%+1:IF p%>12 p%=0
5130 IF k%=139 p%=p%-1:IF p%<0 p%=12
5140 IF p%>6 AND I%=13 I%=14
5150 IF p%<7 AND I%=14 I%=13
5160 PRINTTAB(25,le%+1)"  ";CHR$135;
5170 PRINTTAB(25,p%+1)CHR$129;CHR$157;CHR$135;e%(I%,p%);"   ":le%=p%
5180 IF C%>1-D% PROCenv(I%,C%*2+8)
5190 IF C%=1 AND D%=0 PROCenv(13,7):PROCenv(14,8)
5200 IF C%=0 AND D% PROCenv(I%,I%*2-19)
5210 VDU28,8,19,39,18,31,X%,Y%
5220 ENDPROC
```

Pieces of 8

Listing 1

```
10 REM Spectramania (Spec1)
20 REM by David Acton
30 REM BBC B/B+/128k and Electron
40 REM (c) BAU Aug 91
50 :
60 MODE 5
70 VDU 19,3,9,0;0,23;6,23;0;0;0
80 ENVELOPE 1,2,0,0,0,0,0,0,126,-1,0,-1,126,63
90 ENVELOPE 2,2,0,72,-72,0,3,3,126,0,0,-1,126,63
100 ENVELOPE 3,3,-4,-1,2,6,6,28,81,-4,-5,-1,126,63
110 ENVELOPE 4,3,1,-2,1,1,1,1,126,-1,0,-1,100,63
120 *FX 9,1
130 *FX 10,1
140 *FX 225
150 FOR X%=0 TO 31:A%=&3000+640*X%
160 X%?&CA0=A% DIV256:X%?&CC0=A%:NEXT
170 T%=0:FOR X%=&B00 TO &C9C STEP4
180 READ!X%:T%=T%+!X%
190 NEXT:!&75=RND:!&79=&768553
200 IFT%<>&3A816AC7 MODE6:PRINT"Data error - please check listing":END
210 PRINTTAB(4,2)"SPECTRAMANIA"
220 COLOUR2:PRINTTAB(5,6)"by D Acton"
230 COLOUR1:PRINTTAB(6,12)"LOADING."
240 VDU 28,1,22,18,20
250 PAGE=&3000:CHAIN"Po82"
260 DATA &B0B0F050,&F00050F0
270 DATA &D070F0F0,&F050F0F0
280 DATA &E0B0F0F0,&F0A0F0F0
290 DATA &7070F0A0,&F000A0F0
300 DATA &A0A0A0A0,&F0A0
310 DATA &F0F0F0F0,&30101010
320 DATA &F0F0F0F0,&30202020
330 DATA &50505050,&F050
340 DATA &1000A050,&30307030
350 DATA &B0B0A0A0,&30B03030
360 DATA &70705050,&30703030
370 DATA &200050A0,&3030B030
380 DATA &30306060,&103030
390 DATA &60309090,&3060C030
400 DATA &90306060,&3090C030
410 DATA &30309090,&203030
420 DATA &10000000,&30303030
430 DATA &F0300000,&B0B0F0B0
440 DATA &F0300000,&7070F070
450 DATA &20000000,&30303030
460 DATA &30303030,&1030
470 DATA &90909030,&30C090
480 DATA &60606030,&30C060
490 DATA &30303030,&2030
500 DATA &F0500000,&E0E0E0F0
510 DATA &F0F0F000,&30706030
520 DATA &F0F0F000,&30E0C030
530 DATA &F0A00000,&70707070
540 DATA &E0E0E0E0,&50F0
550 DATA &F0707060,&F0F0F0
560 DATA &F0F0F0C0,&F0F0F0
570 DATA &F0F0F0F0,&A0F0
580 :
590 DATA &71353529,&15511535
600 DATA &192A2315,&42480661
610 DATA &2A33610C,&231C0A2A
620 DATA &3629060C,&421C2A0A
630 DATA &15357429,&36482354
640 DATA &35686219,&62151535
650 DATA &680A3368,&41410962
660 DATA &A626803,&C2A2A0A
670 DATA &2A064444,&1C0A0A2A
680 DATA &29231554,&A367435
690 DATA &33613548,&61192A2A
700 DATA &350C4215,&54740C36
710 DATA &6151C06
720 :
730 DATA &F0C0300,&2060400
740 DATA &2020202,&222A2222
750 DATA &222A2A22,&2C1414EC
760 DATA &2C442C44,&4050404
770 DATA &4050504,&1000009
780 DATA &1020102,0,0
790 DATA &FFF80000,&10002
```

Listing 2

```
10 REM Spectramania (Spec2)
20 REM by David Acton
30 REM for BBC B/B+/128k and Electron
40 REM (c) BAU Aug 91
50 :
60 HIMEM=&8000:LOMEM=&7500
70 ad=&70:ad2=&72:at=&74
80 rd=&75:rc=&79:ct1=&7C:ct2=&7D
90 ymod=&7E:ymi=&7F:read=&80:end=&84
100 map%=&C00:mcol%=&900:code%=&C64
110 ah%=&CA0:al%=&CC0:mv%=&9AF
120 cb=&C68:cx=&964:cy=&96C:cp=&974
130 xst=&82:frz=&89:cell=&83:mnc=&8A
140 targ=&86:tot=&85:lvl=&87:cst=&88
150 csx=&C70:csy=&C78:cc=&984:cd=&97C
160 csmx=&C80:csmy=&C88:cm=&994
170 cmx=&99F:cmy=&9A7:cj=&98C
180 sw=&C90:sw2=&C98:sc=&99C
190 a=&FFEE:w=&FFF1:b=&FFF4
200 FOR pass%=0 TO 2 STEP2:P%=&2A29
210 [OPT pass%
220 .cad
230 TYA:PHA
240 LSR A
250 LSR A
260 LSR A
270 TAY:PLA
280 AND #7
290 CLC
300 ADC al%,Y
310 STA ad
320 LDA #0:STA at
330 ADC ah%,Y
340 STA ad+1
350 TXA
360 ASL A
370 ASL A:ROL at
380 ASL A:ROL at
390 CLC
400 ADC ad
410 STA ad
420 LDA ad+1
430 ADC at
440 STA ad+1
450 RTS
460 .loc
470 TYA:ASL A
480 STA at
490 ASL A
500 ASL A
510 CLC
520 ADC at
530 STA at
540 TXA
550 ADC at
560 RTS
570 .block
580 JSR loc
590 PHA
600 TXA
610 ASL A:ASL A
620 ASL A
630 TAX
640 TYA
650 ASL A:ASL A
660 ASL A
670 STA at
680 ASL A
690 ADC at
700 ADC #16
710 TAY
720 JSR cad
730 LDA ad
740 STA ad2
750 LDA ad+1
760 STA ad2+1
770 PLA:TAX
780 LDA map%,X
790 STA at
800 LDA mcol%,X
810 AND #3:TAX
820 LDA code%,X
830 LDX #3
840 .blp LDY #63
850 .blp2 STA (ad),Y
860 DEY:BPL blp2
870 PHA
880 JSR csub2b
890 PLA
900 DEX:BNE blp
910 .bt LDA #1
920 JSR and
930 JSR hor
940 .bl LDA #8
950 JSR and
960 JSR vert
970 .bb LDA ad2
980 SEC
990 SBC #121
1000 STA ad2
1010 LDA ad2+1
1020 SBC #2
1030 STA ad2+1
1040 LDA #4
1050 JSR and
1060 JSR hor
```

```
1070 .br LDA ad2
1080 SEC
1090 SBC #207
1100 STA ad2
1110 LDA ad2+1
1120 SBC #4
1130 STA ad2+1
1140 LDA #2
1150 JSR and
1160 .vert LDX #3
1170 STA v3+1
1180 .v2 LDY #7
1190 .v3 LDA #0
1200 ORA (ad2),Y
1210 STA (ad2),Y
1220 DEY:BPL v3
1230 JSR csub2
1240 DEX:BNE v2
1250 RTS
1260 .hor LDX #8
1270 LDY #0
1280 STA h2+1
1290 .h2 LDA #0
1300 ORA (ad2),Y
1310 STA (ad2),Y
1320 JSR yadd
1330 DEX:BNE h2
1340 RTS
1350 .and
1360 AND at:BEQ a2
1370 LDA #63
1380 .a2 RTS
1390 .key LDY #&FF
1400 LDA #129
1410 JSR b
1420 CPX #255
1430 RTS
1440 .rand
1450 TXA:PHA
1460 LDY #8
1470 .r1 CLC
1480 LDA rd+3
1490 BPL r3
1500 LDX #2
1510 .r2 LDA rd,X
1520 EOR rc,X
1530 STA rd,X
1540 DEX:BPL r2
1550 SEC
1560 .r3 ROL rd
1570 ROL rd+1
1580 ROL rd+2
1590 ROL rd+3
1600 DEY:BPL r1
1610 PLA:TAX
1620 LDA rd+3
1630 RTS
1640 .adp
1650 LDX #sw2 MOD256
1660 LDY #sw2 DIV256
1670 LDA #7
1680 JSR w
1690 LDX #21
1700 LDY #0
1710 .adsc SED
1720 TXA
1730 CLC
1740 ADC sc
1750 STA sc
1760 TYA
1770 ADC sc+1
1780 STA sc+1
1790 LDA sc+2
1800 ADC #0
1810 STA sc+2
1820 CLD
1830 .score LDA #30
1840 JSR a
1850 LDX #2
1860 .sc2 LDA sc,X
1870 LSR A:LSR A
1880 LSR A:LSR A
1890 CLC:ADC #48
1900 JSR a
1910 LDA sc,X
1920 AND #15
1930 CLC:ADC #48
1940 JSR a
1950 DEX
1960 BPL sc2
1970 RTS
1980 .sound
1990 STX sw+6
2000 STY sw+2
2010 PHA
2020 AND #252
2030 STA sw+4
2040 PLA
2050 AND #3
2060 STA sw
2070 LDX #sw MOD256
2080 LDY #sw DIV256
2090 LDA #7
2100 JMP w
2110 .vd19
2120 LDA #19:JSR a
2130 TXA:JSR a
2140 TYA:JSR a
2150 LDA #0:JSR a
2160 JSR a:JMP a
2170 .char LDA cb,X
2180 ASL A:ASL A
2190 ASL A:ASL A
2200 ASL A
2210 STA read
2220 LDA #&B
2230 STA read+1
2240 LDY cy,X
2250 LDA cx,X
2260 TAX
2270 JSR charsub
2280 .char2 LDX ymi
2290 .char3
2300 LDA (read),Y
2310 ORA (ad),Y
2320 STA (ad),Y
2330 INY
2340 DEX:BNE char3
2350 LDX ymod
2360 BNE char4
2370 JMP char5
2380 .char4
2390 LDA (read),Y
2400 ORA (ad2),Y
2410 STA (ad2),Y
2420 INY
2430 DEX:BNE char4
2440 .char5
2450 DEC ct1:BNE char2
2460 LDA read
2470 CLC
2480 ADC #32
2490 STA read
2500 JSR csub2
2510 DEC ct2:BNE char2
2520 RTS
2530 .del LDY cy,X
2540 LDA cx,X
2550 TAX
2560 JSR charsub
2570 .del2 LDX ymi
2580 .del3 LDA (ad),Y
2590 AND #15
2600 STA (ad),Y
2610 INY
2620 DEX:BNE del3
2630 LDX ymod
2640 BNE del4
2650 JMP del5
2660 .del4
2670 LDA (ad2),Y
2680 AND #15
2690 STA (ad2),Y
2700 INY
2710 DEX:BNE del4
2720 .del5
2730 DEC ct1:BNE del2
2740 JSR csub2
2750 DEC ct2:BNE del2
2760 RTS
2770 .charsub
2780 TYA:PHA
2790 AND #7
2800 STA ymod
2810 PLA:TAY
2820 JSR cad
2830 LDA ad
2840 CLC:ADC #120
2850 STA ad2
2860 LDA ad+1
2870 ADC #2
2880 STA ad2+1
2890 LDY #0
2900 LDA #8
2910 SEC:SBC ymod
2920 STA ymi
2930 LDA #4
2940 STA ct1
2950 LDA #2
2960 STA ct2
2970 RTS
2980 .csub2 LDA ad2
2990 CLC:ADC #128
3000 STA ad2
3010 LDA ad2+1
3020 ADC #2
3030 STA ad2+1
3040 .csub2b
3050 LDA ad
3060 CLC:ADC #128
3070 STA ad
3080 LDA ad+1
3090 ADC #2
3100 STA ad+1
3110 LDY #0
3120 LDA #4
3130 STA ct1
3140 RTS
3150 .main JSR spec
3160 JSR spb
3170 LDA end
3180 BNE e2
3190 LDX #14
3200 LDY #0
3210 .ent LDA #255
3220 STA &3B0F,Y
3230 JSR yadd
3240 DEX:BNE ent
3250 .e2 LDX #7
3260 .m2 STX xst
3270 TXA
3280 AND #3
3290 BNE m3
3300 .synchro
3310 LDA #19:JSR b
3320 LDX xst
3330 .m3 LDA cp,X
3340 BNE m3b
3350 JMP mn2
3360 .m3b LDA frz
3370 BEQ m4
3380 CPX #3:BCC m4
3390 JSR char
3400 LDX xst
3410 JMP mn2
3420 .m4 LDA cc,X
3430 BEQ m5
3440 JSR del
3450 LDX xst
3460 LDA cd,X
3470 LSR A
3480 BCC m4b
3490 LDA cy,X
3500 SEC:SBC #3
3510 STA cy,X
3520 JMP m4e
3530 .m4b LSR A
3540 BCC m4c
3550 INC cx,X
3560 JMP m4e
3570 .m4c LSR A
3580 BCC m4d
3590 LDA cy,X
3600 CLC:ADC #3
3610 STA cy,X
3620 JMP m4e
3630 .m4d LSR A
3640 BCC m4e
3650 DEC cx,X
3660 .m4e JSR char
3670 LDX xst
3680 DEC cc,X:BEQ m5
3690 JMP mn
3700 .m5 LDY cmy,X
3710 LDA cmx,X
3720 TAX
3730 JSR loc
3740 TAX
3750 LDA map%,X
3760 STA cell
3770 LDX xst
3780 CPX #0:BNE m6
3790 JSR change
3800 LDX #158
3810 JSR key
3820 BNE m5b
3830 LDA #8
3840 JMP m5e
3850 .m5b LDX #189
3860 JSR key
3870 BNE m5c
3880 LDA #2
3890 JMP m5e
3900 .m5c LDX #183
3910 JSR key
3920 BNE m5d
3930 LDA #1
3940 JMP m5e
3950 .m5d LDX #151
3960 JSR key
3970 BNE m5f
3980 LDA #4
3990 .m5e LDX xst
4000 JSR ok
4010 JMP mn
4020 .m5f LDA #16
4030 STA cd
4040 JMP mn
4050 .m6 CPX #3
4060 BCS m7
4070 .m6b LDA cell
4080 LSR A:LSR A
4090 LSR A:LSR A
4100 AND #3:TAY
4110 LDA mv%,Y
4120 JSR ok
4130 JMP mn
4140 .m7 LDA cm,X
4150 BNE m8
4160 LDA cx,X
4170 CMP cx
4180 BEQ m7c
4190 BCC m7b
4200 LDA cell
4210 AND #8
4220 BNE m7c
4230 LDA #8
4240 JMP m7e
4250 .m7b LDA cell
4260 AND #2
4270 BNE m7c
4280 LDA #2
4290 JMP m7e
4300 .m7c LDA cy,X
4310 CMP cy
4320 BEQ m7f
4330 BCC m7d
4340 LDA cell
4350 AND #1
4360 BNE m7f
4370 LDA #1
4380 JMP m7e
4390 .m7d LDA cell
4400 AND #4
4410 BNE m7f
4420 LDA #4
4430 .m7e JSR ok
4440 JMP mn
4450 .m7f LDA #1
4460 STA cm,X
4470 JSR rand
4480 AND #3
4490 ORA #1
4500 STA cj,X
4510 JMP m6b
4520 .m8 LDA cell
4530 AND #64
4540 BEQ m6b
4550 DEC cj,X
4560 BNE m6b
4570 LDA #0
4580 STA cm,X
4590 JMP m7
4600 .mn LDX xst
4610 BEQ mn2
4620 .col LDA cx,X
4630 SEC:SBC cx
4640 BCS c2
4650 LDA cx
4660 SEC:SBC cx,X
4670 .c2 CMP #2
4680 BCS c4
4690 LDA cy,X
4700 SEC:SBC cy
4710 BCS c3
4720 LDA cy
4730 SEC:SBC cy,X
4740 .c3 CMP #4
4750 .c4 BCS mn2
4760 CPX #3
4770 BCC c5
4780 LDA mnc
4790 BNE c4b
4800 LDA #1
4810 STA end
4820 JMP mn2
4830 .c4b JSR del
4840 LDX #0
4850 JSR char
4860 LDX xst
4870 JSR res2
4880 LDA #200
4890 STA cc,X
4900 LDX #0
4910 LDY #16
4920 JSR adsc
4930 LDX xst
4940 JMP mn2
4950 .c5 LDA#0
4960 STA cp,X
4970 JSR del
4980 LDX #7
4990 LDY #15
5000 JSR vd19
5010 LDX #0
5020 LDY #5
5030 JSR adsc
5040 LDX #0
5050 JSR char
5060 LDX xst
5070 LDA #200
5080 CPX #1:BNE c6
5090 STA frz
5100 JMP mn2
5110 .c6 STA mnc
5120 .mn2
5130 DEX:BMI m9
5140 JMP m2
5150 .m9
5160 LDA end:BNE out
5170 LDA targ
5180 CMP tot:BEQ out
5190 JMP main
5200 .out RTS
5210 .ok TAY
5220 AND cell:BNE ok6
5230 CPY #1
5240 BNE ok2
5250 DEC cmy,X
5260 JMP ok5
5270 .ok2
5280 CPY #2:BNE ok3
5290 INC cmx,X
5300 JMP ok5
5310 .ok3
5320 CPY #4:BNE ok4
5330 INC cmy,X
5340 JMP ok5
5350 .ok4 DEC cmx,X
5360 .ok5 TYA
5370 STA cd,X
5380 LDA #8
5390 STA cc,X
5400 RTS
5410 .ok6 LDA #1
5420 STA cc,X
```

```
5430 LDA #16
5440 STA cd,X
5450 RTS
5460 .change LDA cd
5470 CMP #16:BEQ ch6
5480 LDY cmy
5490 LDX cmx
5500 JSR loc
5510 TAX
5520 LDA mcol%,X
5530 STA cst
5540 CMP #1:BNE ch2
5550 INC mcol%,X
5560 JMP ch5
5570 .ch2
5580 CMP #2:BNE ch3
5590 LDA lvl
5600 CMP #1:BEQ ch5
5610 CMP #3:BEQ ch4
5620 INC mcol%,X
5630 JMP ch5
5640 .ch3 LDA lvl
5650 CMP #2:BEQ ch5
5660 CMP #4:BEQ ch4
5670 DEC mcol%,X
5680 .ch4 DEC mcol%,X
5690 .ch5 LDA mcol%,X
5700 SEC:SBC cst
5710 CLC:ADC tot
5720 CMP tot
5730 PHP
5740 STA tot
5750 LDY cmy
5760 LDX cmx
5770 JSR block
5780 LDX xst
5790 JSR char
5800 PLP
5810 BCC ch6
5820 BEQ ch6
5830 JMP adp
5840 .ch6 RTS
5850 .res2
5860 LDX #5
5870 LDY #3
5880 LDA #65
5890 JSR sound
5900 LDX xst
5910 .reset
5920 LDA csx,X
5930 STA cx,X
5940 LDA csy,X
5950 STA cy,X
5960 LDA csmx,X
5970 STA cmx,X
5980 LDA csmy,X
5990 STA cmy,X
6000 LDA #16
6010 STA cd,X
6020 JSR rand
6030 AND #15
6040 ADC #5
6050 STA cc,X
6060 JSR rand
6070 AND #7
6080 ADC #2
6090 STA cj,X
6100 RTS
6110 .bar PHA
6120 JSR cad
6130 PLA
6140 LSR A:LSR A
6150 LSR A
6160 LDY #0
6170 TAX
6180 BEQ br3
6190 .br2 LDA #3
6200 STA (ad),Y
6210 INY
6220 LDA #15
6230 STA (ad),Y
6240 INY
6250 STA (ad),Y
6260 INY
6270 LDA #3
6280 STA (ad),Y
6290 TYA
6300 CLC:ADC #5
6310 TAY
6320 DEX
6330 BNE br2
6340 .br3 LDX #7
6350 LDA #0
6360 .br4 STA (ad),Y
6370 INY
6380 DEX:BPL br4
6390 RTS
6400 .spec LDA frz
6410 BEQ spc2
6420 DEC frz
6430 LDA frz
6440 LDX #10
6450 JSR specsub1
6460 JSR b
6470 LDA frz
6480 AND #252
6490 ORA #1
6500 JSR specsub2
6510 .spc2
6520 LDA mnc:BEQ spc3
6530 DEC mnc
6540 LDA mnc
6550 LDX #50
6560 JSR specsub1
6570 INX
6580 JSR b
6590 LDA mnc
6600 AND #252
6610 ORA #2
6620 JMP specsub2
6630 .spc3
6640 LDA frz:BNE spc4
6650 LDA mnc:BNE spc4
6660 LDX #7
6670 LDY #7
6680 JMP vd19
6690 .spc4 RTS
6700 .spb LDX #2
6710 .spb2 LDA cp,X
6720 BNE spb3
6730 JSR rand
6740 BNE spb3
6750 JSR rand
6760 AND #7
6770 BNE spb3
6780 INC cp,X
6790 JSR reset
6800 .spb3 DEX
6810 BNE spb2
6820 RTS
6830 .yadd TYA
6840 CLC:ADC #8
6850 TAY
6860 RTS
6870 .specsub1
6880 LDY #10
6890 JSR bar
6900 LDA #21
6910 LDX #5
6920 RTS
6930 .specsub2
6940 LDX #1
6950 LDY #2
6960 JMP sound
6970 ]NEXT
6980 REM Checksum
6990 total%=0
7000 FOR byte%=&2A29 TO P%
7010 total%=total%+?byte%:NEXT
7020 IF total%<>157837 CLEAR:MODE6:PRIN
T"Checksum error - please check listing.
":END
7030 IF FNelk THEN ?synchro=&EA:synchro
!1=&EAEAEAEA
7040 CLS:PAGE=&1900:CHAIN"Po83"
7050 DEFFNelk=(INKEY(-256)=1)
```

Listing 3

```
10 REM Spectramania (Spec3)
20 REM by David Acton
30 REM for BBC B/B+/128k and Electron
40 REM (c) BAU Aug 91
50 :
60 MODE2:VDU23,1,0,0;0;0;0;
70 HIMEM=&2A29
80 PROCvar
90 REPEAT
100 FOR X%=4 TO 7
110 PROCr(X%,7):PROCr(X%+4,0)
120 PROCr(X%+8,6):NEXT
130 CLS:PROCreset
140 ?cx=34:?cy=44:?end=1
150 !cp=0:cp!4=&1010101
160 COLOUR1:PRINTTAB(4,2)"SPECTRAMANIA
"
170 COLOUR2:PRINTTAB(4,6)"Mega-scores:
"
180 FOR U%=1 TO 10
190 COLOUR1:PRINTTAB(0,7+2*U%);U%
200 COLOUR2:PRINTTAB(3,7+2*U%)RIGHT$("
000"+STR$hs%(10-U%),6)" ";
210 COLOUR3:PRINThs$(10-U%)
220 NEXT
230 COLOUR2:PRINTTAB(1,30)"PRESS SPACE
 BAR TO"TAB(8,31)"PLAY";
240 REPEAT:?cx=76-?cx:CALL&2C7F
250 UNTIL INKEY(-99):CLS
260 lives=3:round=1:?lvl=1:!sc=0
270 REPEAT:PROCinfo:PROCreset:*FX 15
280 FOR Y%=0 TO 9:FOR X%=0 TO 9
290 CALL&2A64:NEXT,
300 COLOUR 7:CALL&2B63
310 PRINTTAB(14,0)RIGHT$("0"+STR$hs%(9
),6)
320 COLOUR2:PRINTTAB(0,1)"FR"SPC8"PW"
330 COLOUR1:PRINTTAB(7,0)"LVS: ";lives
-1
340 PROCdisp(0):COLOUR128:COLOUR2
350 PRINTTAB(7,19)"READY!"
360 PROCd(200):PROCcl
370 PRINTTAB(7,18)"CHANGE"TAB(9,19)"TO
"
380 COLOUR131:IF?lvl=1 OR?lvl=3 COLOUR
130
390 PRINTTAB(9,20)"  "TAB(9,21)"  "
400 COLOUR128:COLOUR7
410 *FX178
420 CALL&2C7F:PROCr(7,7)
430 *FX178,255
440 IF ?end PROCsplat:GOTO560
450 PROCcl:COLOUR5
460 PRINTTAB(7,18)"BONUS:"
470 B%=250*(round+5*(?lvl-1))
480 PRINTTAB(8,20);B%:PROCd(100)
490 X%=80:Y%=0
500 FOR I%=1 TO B%/50:CALL&2B4A
510 SOUND 1,-10,200,1
520 PROCd(10):NEXT
530 PROCd(200):round=round+1
540 IF round=6 round=1:?lvl=?lvl+1:IF?
lvl<4 lives=lives+1
550 IF ?lvl=6 ?lvl=5
560 UNTIL lives=0
570 PROCcl:COLOUR2
580 PRINTTAB(8,18)"GAME"TAB(8,20)"OVER
"
590 RESTORE:PROCtune:PROCd(200):S%=0
600 FOR b%=0 TO 2:S%=S%+((b%?sc)AND15)
*10^(b%*2)+((b%?sc)DIV16)*10^(b%*2+1):NE
XT
610 IFS%<hs%(0) GOTO720
620 p%=0:REPEATp%=p%+1
630 UNTIL S%<hs%(p%) OR p%=10
640 p%=p%-1:IFp%>0 FORX%=0TOp%-1:hs%(X
%)=hs%(X%+1):hs$(X%)=hs$(X%+1):NEXT
650 VDU 20,12:COLOUR14
660 PRINTTAB(8,6)"WOW!":COLOUR3
670 PRINTTAB(3,9)"WHAT A SCORE"
680 COLOUR6:*FX 15,1
690 PRINTTAB(2,12)"Enter your name"
700 COLOUR7:INPUTTAB(5,15)hs$(p%)
710 hs%(p%)=S%
720 UNTILFALSE
730 DEF PROCvar:round=1
740 DIM hs%(10),hs$(10),P%(1),S$(1)
750 FOR X%=0 TO 9:hs%(X%)=2000*(X%+1)
760 hs$(X%)="Ray  Robot":NEXT
770 mcol%=&900:cx=&964:cy=&96C
780 cc=&984:cp=&974:tot=&85:targ=&86
790 end=&84:lvl=&87:frz=&89:mnc=&8A
800 sc=&99C
810 !&9AF=&8040201:ENDPROC
820 DEF PROCr(X%,Y%)
830 CALL&2BA1:ENDPROC
840 DEF PROCreset
850 FOR X%=0 TO 99:X%?mcol%=1:NEXT
860 FOR X%=0 TO 7:CALL &2F26:NEXT
870 ?cc=1:?end=0:?tot=0
880 ?targ=176
890 IF ?lvl=1 OR ?lvl=3 THEN ?targ=88
900 ?frz=0:?mnc=0
910 FOR X%=53 TO 56
920 X%?mcol%=0:X%?(mcol%+10)=0:NEXT
930 ng=round:IF ng<3 ng=3
940 !cp=0:cp!4=0
950 FOR X%=1 TO ng:X%?(cp+2)=1:NEXT
960 ?cp=1
970 ENDPROC
980 DEF PROCd(T):TIME=0
990 REPEAT UNTIL TIME>T:ENDPROC
1000 DEF PROCcl
1010 FOR X%=3 TO 6:FOR Y%=5 TO 6
1020 CALL &2A64:NEXT,:ENDPROC
1030 DEF PROCsplat:PROCdisp(3)
1040 PROCd(100):PROCcl:lives=lives-1
1050 PRINT TAB(7,19)"SPLAT!"
1060 FOR X=99 TO 33 STEP-33
1070 FOR Y=1 TO 6
1080 SOUND 1,1,X+4*Y,1:NEXT,
1090 FOR X=30 TO 3 STEP -3
1100 SOUND 1,2,X,2:NEXT
1110 PROCd(200):ENDPROC
1120 DEF PROCdisp(U%)
1130 FOR X%=U% TO 7:IFcp?X% CALL&2BB9
1140 NEXT:ENDPROC
1150 DEF PROCinfo:CLS:COLOUR2
1160 PRINT TAB(6,13)"LEVEL  ";?lvl
1170 COLOUR3
1180 PRINT TAB(6,17)"ROUND  ";round
1190 TIME=0:REPEAT
1200 PROCq(41):PROCq(49)
1210 PROCq(53):PROCq(69)
1220 UNTIL TIME>300:CLS:ENDPROC
1230 DEF PROCq(P%)
1240 PROCts(P%):PROCts(P%-4)
1250 PROCts(P%):ENDPROC
1260 DEF PROCts(P%):FOR Y%=1 TO 3
1270 SOUND Y%,1,P%,2:NEXT:ENDPROC
1280 DEF PROCtune:P%(0)=1:P%(1)=1
1290 READ S$(0),S$(1)
1300 REPEAT:FOR Y%=0 TO 1
1310 IF Y%=1 AND FNelk THEN GOTO 1350
1320 IF P%(Y%)>LENS$(Y%) ORADVAL(-6-Y%)
=0 GOTO1350
1330 V=EVAL("&"+MID$(S$(Y%),P%(Y%),2))
1340 SOUND Y%+1,4,(V AND63)*4+1,(V AND1
92)/16:P%(Y%)=P%(Y%)+2
1350 NEXT:UNTIL P%(0)>LENS$(0):ENDPROC
1360 DATA 6E6A67A267AA6965629D5E9D67656
4A9676564E2
1370 DATA 9E9E9D9B9D999B99989B919BDD
1380 DEF FNelk=(INKEY(-256)=1)
```

Listing 4

```
10 REM Equation Solver (Po84)
20 REM using Newton's Method
30 REM by  David Deutsch
40 REM and David Johnson-Davies
50 REM for BBC B/B+/M/E
60 REM (c) BAU Aug 91
70 :
80 INPUT "Equation to solve for X: "g
$
90 E%=INSTR(g$,"=")
100 f$="("+LEFT$(g$,E%-1)+") - ("+MID$
(g$,E%+1)+")"
110 INPUT "Estimated solution: X = "v
120 INPUT "Desired accuracy in X = "ac
curacy
130 :
140 GOTO 190:REM and return here
150 PRINT'"Solution found near X = ";z
160 ON ERROR OFF
170 END
180 :
190 REM 'Subroutine' to find solution
200 oldX=v
210 a=accuracy/10
220 ON ERROR GOTO 320
230 X=v:fx=EVAL(f$)
240 X=v-a:fm=EVAL(f$)
250 X=v+a:fp=EVAL(f$)
260 IF fp=fm THEN a=2*a:GOTO240
270 newX=v-(fp+fm)*a/(fp-fm)
280 ON ERROR OFF
290 IF ABS(newX-v)<=accuracy THEN z=ne
wX:GOTO 150
300 oldX=v:v=newX:GOTO210
310 :
320 REM Error handler
330 IF ERR=17 THEN END
340 IF ERL<>190 THEN a=a/2:GOTO240
350 IF X=oldX THEN PRINT"Function unde
fined at given point":GOTO80
360 v=.5*(v+oldX):GOTO 230
370 a=a/2:GOTO240
```

Listing 5

```
10 REM Spider Curve Drawing Program (
Po85)
20 REM by  David Deutsch
30 REM and David Johnson-Davies
40 REM for BBC B/B+/M/E
50 REM (c) BAU Aug 91
60 :
70 MODE 1:xpix=4:ypix=4:COLOUR 1
80 VDU 19,1,7;0;: VDU 19,2,7;0;: VDU
19,3,1;0;
90 point=69:line=5:@%=0
100 any_r=FALSE:any_t=FALSE
110 PRINT"Equation for the curve in te
rms of"
120 PRINT"any of the following"
130 PRINT"X = horizontal Cartesian coo
rdinate,"
140 PRINT"Y = vertical Cartesian coord
inate,"
150 PRINT"r = radial polar coordinate,
"
160 PRINT"t = angular polar coordinate
,"
170 INPUT''g$
180 E%=INSTR(g$,"=")
190 f$="("+LEFT$(g$,E%-1)+") - ("+MID$
(g$,E%+1)+")"
200 :
210 PRINT '"Position of window:"
220 INPUT"X-coordinate of left edge: "
l$
230 xl=EVAL(l$)
240 INPUT"X-coordinate of right edge:
"u$
250 xr=EVAL(u$)
260 INPUT"Y-coordinate of lower edge:
"l$
270 yl=EVAL(l$)
280 INPUT"Y-coordinate of upper edge:
"u$
290 yu=EVAL(u$)
300 xd=xr-xl:yd=yu-yl
310 :
320 REM axes at (0,0) or (xl,yl)
330 IF xl>0 OR xr<0 THEN xa=xl ELSE xa
=0
340 IF yl>0 OR yu<0 THEN ya=yl ELSE ya
=0
350 colour=1 :REM curve
360 acolour=3 :REM axes and dots
370 :
380 REM Polar Coordinates
390 any_r= INSTR(g$,"r")<>0
400 any_t= INSTR(g$,"t")<>0
410 l$="0":u$="0"
420 IF any_t PROCtrange
430 lowt=EVAL(l$)-0.1:hight=EVAL(u$)+0
.1
440 sheetsize=5
450 :
460 REM Scanning Increments
470 epsilon=0.1:xs=xd/8: ys=yd/6
480 arc=2
490 :
500 REM Start plotting
510 CLG
```

```
520 dy=epsilon*yd/256:dx=epsilon*xd/320
530 :
540 REM Scan Cells for Parts of the Curve
550 xscan=xl+.5*xs
560 IF any_t xscan=xscan+dx*(hight-lowt)/(2*PI)
570 yscan=yl+.5*ys
580 ns=20
590 X=xscan:Y=yscan
600 closer_ret=1:GOTO940
610 ON result GOTO 630,730,780
620 :
630 REM Plot Point on Curve and Move Along it
640 style=point:plot_ret=1:GOTO 1140
650 style=line:xx=X:yy=Y:hits=0:sense=1
660 follow_ret=1:GOTO 1240
670 X=xx:Y=yy:style=point:plot_ret=2:GOTO 1140
680 style=line:hits=0:sense=-1
690 follow_ret=2:GOTO 1240
700 GOTO780
710 :
720 REM Look Harder for Curve
730 X%=FNx(X):Y%=FNy(Y)
740 GCOL 3,3: PLOT point,X%,Y%
750 IF ABS(X-xscan)>xs OR ABS(Y-yscan)>ys THEN 780
760 IF ns>0 THEN ns=ns-1:GOTO600
770 :
780 IF NOT any_t OR yscan>0 OR yscan+ys<0 THEN yscan=yscan+ys ELSE yscan=yscan+ys/3
790 IF yscan<yu THEN 580
800 IF NOT any_t OR xscan>0 OR xscan+xs<0 THEN xscan=xscan+xs ELSE xscan=xscan+xs/3
810 IF xscan<xr THEN 570
820 colour=3-colour
830 lowt=lowt+sheetsize
840 IF lowt<hight THEN 540
850 :
860 REM Draw Axes and Finish
870 GCOL 3,acolour:MOVE FNx(xa),0
880 PLOT 1,0,1023:MOVE 0,FNy(ya):PLOT 1,1279,0
890 IF LEN(g$)<38 PRINTTAB(20-LEN(g$)/2,31);g$;
900 REPEAT:UNTIL INKEY(-99)
910 *SAVE PLOT FFFF3000+5000
920 END
930 :
940 REM 'Closer' - Go Closer to Curve.
950 REM  result: 1=found curve, 2=not found, 3=error
960 x=X:y=Y
970 result=3:ON ERROR IF ERR=17 THEN END ELSE 1110
980 fx=FNeval(x,y)
990 IF fx=0 THEN result=1:GOTO1110
1000 fl=FNeval(x-dx,y)
1010 fr=FNeval(x+dx,y)
1020 fb=FNeval(x,y-dy)
1030 ft=FNeval(x,y+dy)
1040 IF ABS(SGN(fx)+SGN(fl)+SGN(fr)+SGN(fb)+SGN(ft))<>5 result=1:GOTO1110
1050 IF ABS(fx)<.01*(ABS(fl)+ABS(fr)+ABS(ft)+ABS(fb)) result=1:GOTO1110
1060 IF ABS(fr-fx)>ABS(fl-fx) THEN dfx=(fr-fx)/dx ELSE dfx=(fx-fl)/dx
1070 IF ABS(ft-fx)>ABS(fb-fx) THEN dfy=(ft-fx)/dy ELSE dfy=(fx-fb)/dy
1080 q=fx/(dfx*dfx+dfy*dfy)
1090 X=x-q*dfx:Y=y-q*dfy
1100 IF ABS(FNeval(X,Y)) < ABS(fx) THEN result=2
1110 ON ERROR OFF
1120 ON closer_ret GOTO 610,1330
1130 :
1140 REM 'Plot' - Plots Point or Line.
1150 REM result: 0=OK, 1=point already there
1160 X%=FNx(X):Y%=FNy(Y):result=0
1170 FOR j=-1 TO 1:FOR k=-1 TO 1
1180 result=result-(POINT(X%+j*xpix,Y%+k*ypix)=colour)
1190 NEXT:NEXT
1200 result=-(result>1)
1210 GCOL 0,colour:PLOT style,X%,Y%
1220 ON plot_ret GOTO 650,680,1380
1230 :
1240 REM 'Follow' - Follows Curve
1250 ON ERROR IF ERR=17 THEN END ELSE 1400
1260 x=X:y=Y
1270 gx=FNeval(x,y+dy)-FNeval(x,y-dy)
1280 gy=FNeval(x-dx,y)-FNeval(x+dx,y)
1290 q=sense*SQR((gx/dx)*(gx/dx)+(gy/dy)*(gy/dy))*epsilon/arc
1300 X=x-gx/q:Y=y-gy/q
1310 nn=20
1320 closer_ret=2:GOTO940
1330 IF result=1 THEN 1360
1340 nn=nn-1
1350 IF nn>0 THEN 1320 ELSE 1400
1360 IF X<xl OR X>xr OR Y<yl OR Y>yu THEN 1400
1370 plot_ret=3:GOTO1140
1380 style=line:hits=(hits+result)*result
1390 IF hits<=2 THEN 1260
1400 ON ERROR OFF
1410 ON follow_ret GOTO 670,700
1420 :
1430 REM Functions and Procedures
1440 :
1450 DEF FNeval(X,Y)
1460 LOCAL r,t
1470 IF any_r THEN r=SQR(X*X+Y*Y)
1480 IF NOT any_t THEN=EVAL(f$)
1490 IF X=0 THEN t=PI-SGN(Y)*PI/2
1500 IF X<0 THEN t=ATN(Y/X)+PI
1510 IF X>0 THEN t=ATN(Y/X)-(Y<0)*2*PI
1520 t=t-2*PI*INT((t-lowt)/(2*PI))
1530 IF ABS(t-lowt-PI)>3 ERROR
1540 =EVAL(f$)
1550 :
1560 DEF FNx(x)=1280*(x-xl)/xd
1570 DEF FNy(y)=1024*(y-yl)/yd
1580 :
1590 DEF PROCtrange
1600 PRINT''"Approximate range of the angle t:"'
1610 INPUT"Lower bound: "l$
1620 INPUT"Upper bound: "u$
1630 ENDPROC
```

The Monthly Disc.

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32-bit owners.

As a special bonus not only is there Quadline, which will work under !65Host (version 1.40 or greater), but also an enhanced version of Andrew Fedonczuks Mandelbrot program. Re-written by Steve Green (senior programmer at the BBC) it allows you to go deeper into the set, magnify small areas and if you have a multi-sync monitor it produces plots of twice the vertical resolution.

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Running this months Pieces of 8 on an Archimedes.

The three *Spectramania* listings will not work on the Archimedes in native mode. However, by using *!65host* (version 1.40 or greater) you can play the game. Double click on *!65Host*, then enter the listings as normal, saving them to disc as Po81, Po82 and Po83 respectively. Then CHAIN"Po81".

The Spider programs will work in Basic V, except the line in the plot program that saves the screen (line 910), change this from *Save Screen FFFF3000+5000 to *Screensave Screen.



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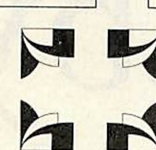
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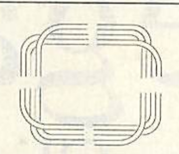
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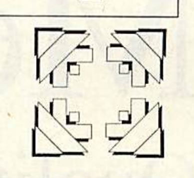
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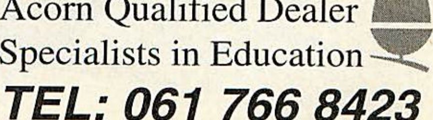
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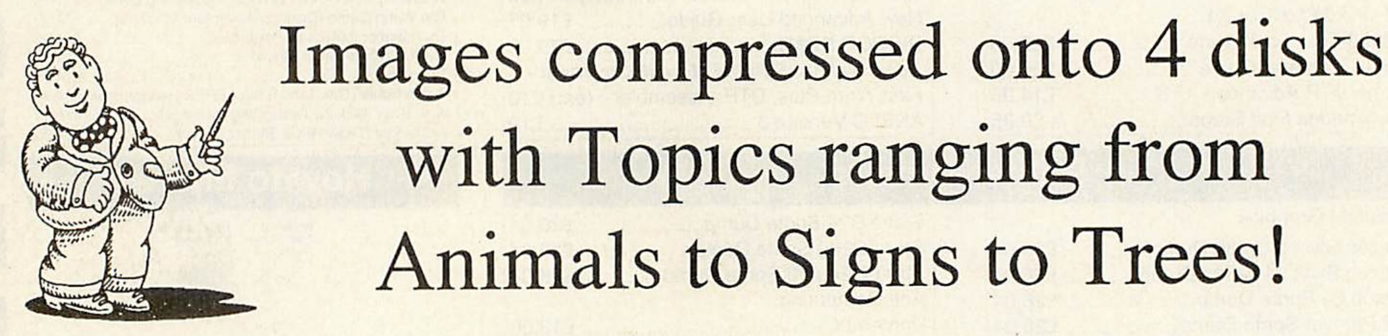




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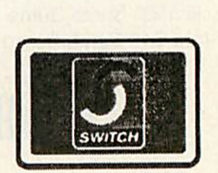


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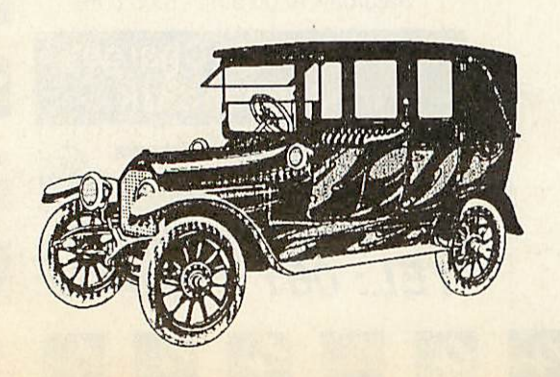
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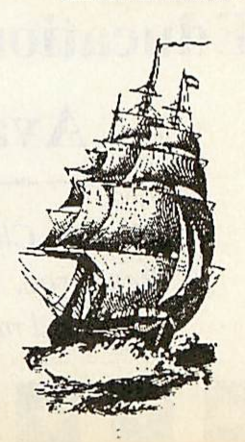


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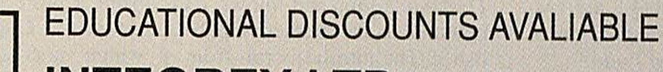
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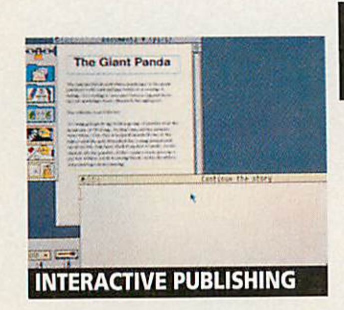
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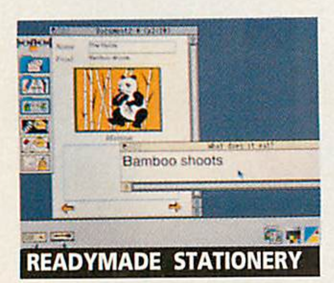
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BETTER BY

How good is ESM's new interactive desktop publishing package for education?



INTERACTIVE PUBLISHING



READYMADE STATIONERY

The choice of desktop publishing packages for the BBC A3000/Archimedes is steadily growing, yet few are designed specifically with education in mind. Recognising this problem, educational publisher ESM has come up with a solution.

Desktop Folio for the BBC A3000/Archimedes follows in the footsteps of two other well-known educational packages – *Folio* and *Advanced Folio*. Tedimen Software first launched *Folio*, a powerful educational wordprocessor for the BBC micro, in 1986. This package is still used in most UK schools.

Advanced Folio, published jointly with ESM two years later, offered wordprocessing with the presentation qualities of a desktop publisher, plus additional fonts and format styles and European and Asian languages.

With the new *Desktop Folio* package, ESM has set out to 'create a microworld for writing', with the minimum of complex preparation required on the part of the user. But has it succeeded?

INTERACTIVE

Desktop Folio offers wordprocessing, desktop publishing and interactive publishing capabilities. Contained within the software package are two applications – *Simple Screen Folio* and *Desktop Folio*.

Children as young as seven years old can cope with the latter application, but because the BBC version of *Folio* was also used by five- and six-year-olds, an introductory wordprocessing application, called *Simple Screen Folio* has also been incorporated.

With this, children can learn to use the mouse, directories, icons, scroll bars, pop-up menus and windows in a secure writing environment.

Users of *Folio* should feel confident with the new *Simple Screen Folio* as the screen appearance is similar, as is the framework in which new concepts are introduced. Moreover, it incorporates a number of the editing features of *Desktop Folio* and comes with the same range of stationery, helping to make transition from *Simple Screen Folio* to *Desktop Folio* easy.

The packaging for *Desktop Folio* is excellent and consists of a compact plastic box, somewhat resembling a lunch box, measuring 215 × 90 × 155mm. Of the six discs that come in their own customised box, four are program and work discs, two are *Desktop Folio* and two are *Simple Screen Folio*. There is also a library disc containing pictures and stationery resources, plus a tutorial disc. The latter consists of a three-section introduction, intended as a brief guide to getting started with *Desktop Folio*, and shows its potential as an interactive publisher. The tutorial is run from an adapted version of the package, but does not allow you to save your work, and also has an adapted version of *Simple Screen Folio*, again with an example document.

The accompanying documentation is comprehensive, and very usable. The *Read Me First* booklet not only provides quick familiarisation of both applications, but it has also been written to be used alongside them. The *Reference Guide* has been designed for dipping into and building up your knowledge as use and skills develop. The *Practical Ideas* book is full of suggestions. The design advice has been well thought out and the links to other software packages are to be applauded.

In a classroom the 12 activity cards will get considerable use as they introduce users to the main functions of *Desktop Folio* with particular clarity.

Desktop Folio has been developed specifically for educational use in infant, junior and secondary school. Therefore despite its immense power it is easy to use and can cope with a child's need to use the computer for a wide variety of writing tasks. It is also ideal for teachers wishing to create and present teaching materials, and to develop materials for administrative use.

GETTING STARTED

Desktop Folio is always run from a protected startup disc, called Desktop Folio Startup, which must always be available. It can be installed onto the hard disc but it must find the startup disc in the floppy

DESIGN?

DAVE FUTCHER looks inside the impressive packaging to find out

disc drive when it is loading from the hard disc. The startup disc also contains the System and a collection of printer drivers and utilities.

When *Desktop Folio* is initially loaded, a message appears on the screen asking for the package's licensee, and for the software's ID number, which can be found inside the Reference Guide. Once that has been dealt with, the application is loaded in the normal Risc OS manner. A dialogue box will open on the screen instructing the user to insert the work disc, click on the floppy disc drive icon and then double-click on FolioWork. These clear instructions ensure that teachers and pupils swap discs efficiently on machines with only one disc drive.

The *Desktop Folio* work disc contains FolioWork, the Fonts folder, and two directories called Public and User that are used in the running of the application.

After double-clicking Select on Foliowork and single clicking on the DTF icon on the icon bar, the page viewer with toolbox attached will appear. When *Desktop Folio* is first used it is automatically loaded with the Letter stationery. However the easy-to-use configuration enables the user to decide which piece of stationery the application will open.

The toolbox gives access to three functions (Write, Draw and Design) and the main folders (Stationery, Resources and Documents) that are needed. As their names imply the Stationery folder contains different types of paper and pictures, other resources are kept in the Resources folder, and documents are filed in the Document folder.

The top icon on the toolbox column is the link icon, and this is used to link or unlink the toolbox to the page window. This ability to detach the toolbox from the page window gives you some flexibility when you have two documents open at once.

WRITE STATIONERY

A central feature of *Desktop Folio* is the concept of stationery, comparable with the use some DTP packages make of master pages. The underlying concept is to allow the expert user to give support to the novice by creating stationery appropriate to the writing task. This allows the inexperienced user to concentrate on the writing. Stationery can be opened with format, text and pictures already set up, together with empty frames, into which the user can insert text and pictures. An example of this is the piece of stationery on the tutorial disc called Poster, which has a blank piece of paper pinned to a tree.

Although the style of the frame can also be predetermined, it is possible to change the style by accessing the menu within the frame.

The concept of stationery also helps children to contextualise their work, by choosing a letter, poster or newsletter format, almost as though they were working on paper.

Ready designed stationery is loaded into the *Desktop Folio* page viewer by clicking on the required design in the Stationery folder and dragging it across. The areas of the page in which you can write are the frames with a blue outline.

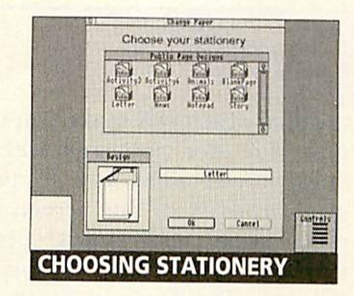
To write in a frame you simply point to it with the mouse, and click Select, which opens up a window where you can enter your text. If you click Select on a second frame the first window closes, whereas clicking Adjust leaves the first open as well .

The page window gives an overall impression of the page's appearance, while the frame window displays the text. This is an excellent system to ensure that you can work on a small area in great detail, while still being able to retain an overall view.

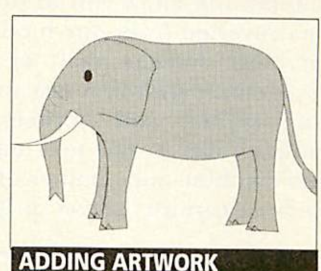
Full editing facilities are available. Text can be inserted and deleted, and usefully the delete, copy and backspace keys can be set for particular functions to suit your needs. The Selection box enables you to copy, cut, delete, underline and colour the text, and the clip board is one of the best available. It temporarily holds up to five spaces for cut text, and one for deleted text.

INTERIOR DESIGN

Although a range of stationery is provided with *Desktop Folio,* users of any age will

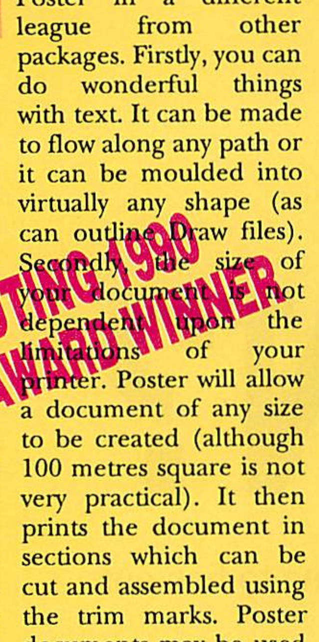


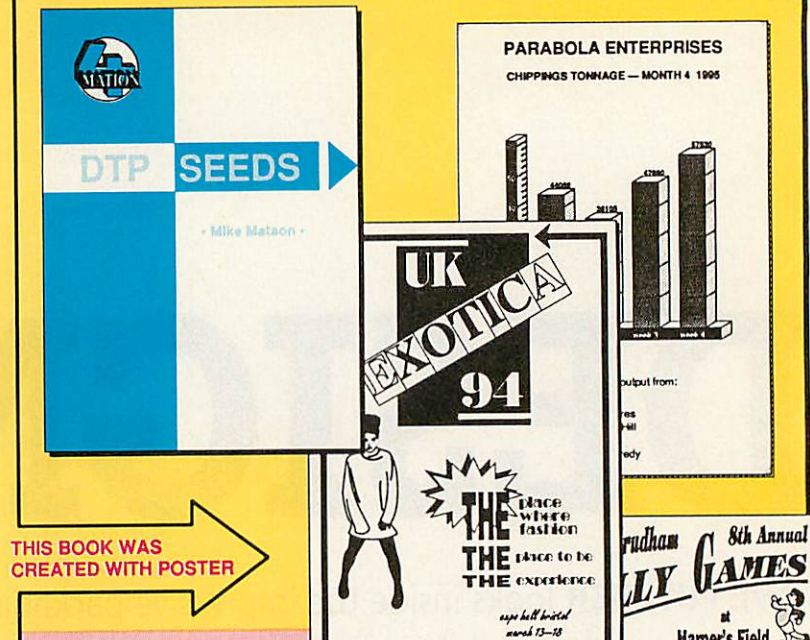
CHOOSING STATIONERY


ADDING ARTWORK

Poster

An object-based DTP package which allows you to do far more than create posters. In fact there isn't much in the way of DTP design and layout that can't be done with Poster. It's almost an art package. The application is fully RISC OS compliant so can 'talk' to Edit, Draw and any other RISC OS program. Poster comes with its own set of unusual outline fonts but will allow you to use any RISC OS outline fonts. It also has a huge collection of interesting borders and clip art. Two features place Poster in a different league from other packages. Firstly, you can do wonderful things with text. It can be made to flow along any path or it can be moulded into virtually any shape (as can outline Draw files). Secondly, the size of your document is not dependent upon the limitations of your printer. Poster will allow a document of any size to be created (although 100 metres square is not very practical). It then prints the document in sections which can be cut and assembled using the trim marks. Poster documents may be used in other DTP packages.



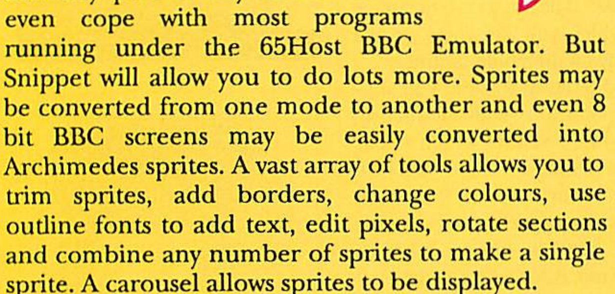


DTP SEEDS

Your Desk Top Publishing program is capable of producing some stunning results. But are you? Do you sit and stare at that blank screen wondering where to start? DTP SEEDS is a book to flick through, a collection of ideas designed to get your imagination working. There are no pages of heavy text to wade through, no references to kerning and leading; just page after page of examples for you to copy, adapt and improve upon. The contents are divided into:

School Stationery • Business Stationery • Emphasis
Page Layouts • Front Pages • Covers • Posters
Graphs • Titles • Flyers • Contents Pages • Logos
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Snippet



A utility which will make you wonder how you ever managed without it. Snippet will allow you to print or save any part of any screen. It will even cope with most programs running under the 65Host BBC Emulator. But Snippet will allow you to do lots more. Sprites may be converted from one mode to another and even 8 bit BBC screens may be easily converted into Archimedes sprites. A vast array of tools allows you to trim sprites, add borders, change colours, use outline fonts to add text, edit pixels, rotate sections and combine any number of sprites to make a single sprite. A carousel allows sprites to be displayed.

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ALSO...

JIGSAW — allows sprites of any size to be converted into jigsaws with real jisaw-shaped pieces. It comes complete with a set of pictures including some by the well-known artist Rodney Matthews.

JIGLET — the version for younger users. It has fewer pieces and a more appropriate set of pictures.

CRAFTSHOP 1 and CRAFTSHOP 2 — programs allowing those with limited artistic ability to create some stunning results. Both packages are currently in use in thousands of schools and homes.



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soon want to design their own.

Just like any other DTP package *Desktop Folio* lets you design your document as you are producing it. Although this is not the best way to proceed, *Desktop Folio* automatically distinguishes between the design of the page and any text and pictures that may have been added to the frames.

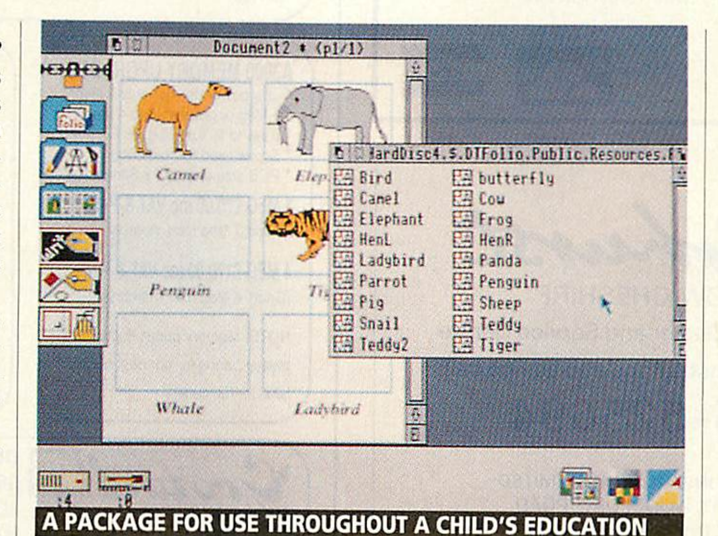
It is only when the user adds something to a piece of stationery that it becomes a document. This allows the design stored in the Stationery folder to be used for other documents.

Formats and styles are designed to help you use the vast array of possible font, size, colour and format combinations consistently throughout a document or a set of documents. All fonts are Electronic Font Foundry compatible. A number of styles are already defined – Title style is black 56pt Times Bold, Heading style is black 36pt Times Italic, and Plain style is black 14pt Swiss characters. When you are designing stationery it is possible, and relatively simple, to amend and enlarge the list of formats and styles available in the menu.

When the Design icon has been selected it's simply a matter of drawing frames on a page. With the options that let you copy, move, adjust, overlap and hide frames it is really very easy, and the built in grid allows accurate positioning and ease of design. Within the frame's menu, the Format option controls paragraph spacing, justification (left, right and centre) and the number of columns required. Style controls the characteristics of the frame's typeface including the font, type size, width, attribute (when bold and italic are available), and colour of background and foreground.

As well as leaving frames blank for text to be added, frames can also have pictures or words dropped into them.

In *Desktop Folio* pictures can be placed in documents by dragging *Draw* and *Paint* files into frames. To help users find suitable pictures, stationery authors can create special frames called Selection frames which have a folder of frames linked to them. The folder can be opened by double-clicking on the frame, which brings up a normal directory viewer. A picture can then be chosen from the files and dragged into the frame to display it.



A PACKAGE FOR USE THROUGHOUT A CHILD'S EDUCATION

Desktop Folio provides another way of adding pictures to frames, through using Pick Art stationery. This has a set of small pictures on a page that can be selected from. The one you want to use is clicked on and the file icon appears at the top right of the screen and has to be dragged into the viewer.

By locking a frame you protect its contents, and make it part of the background as if it were printed on the paper. By setting the window's size and position, setting up a range of styles and linking resources such as a set of pictures you can provide users with easy access to the tools they need so that they can concentrate on their writing.

It is even possible to set frames so that they do not print. This is particularly useful when you want to place instructions or buttons on the page and then don't want these to appear in any subsequent printed work.

ACTIVITY LINK UPS

Frames in *Desktop Folio* can be made into buttons to execute specified commands in response to being clicked upon by the mouse, thus creating interactive documents. This allows teachers to create a directed writing environment in which the user can read and write interactively, deciding which path to take next.

Using the interactive features the teacher can give instructions, pose problems, ask questions and prompt pupils to seek solutions in a similar way to a good worksheet. The advantage of using *Desktop Folio* for this type of task is that pupils can add and edit information with very little effort. Documents can be specifically related to simple science experiments or can be designed as a follow up to educational trips.

Within the package, pages can be connected. A linear route does not have to be followed. This is particularly useful for designing branching documents, decision making tasks, or adventure type stories. You can have contents pages that jump to other pages within the document, and individual pages that lead to optional pages as well as Help pages which can be referred to at any time.

CONCLUSION

Desktop Folio is a powerful publishing package designed for use throughout a child's education. Both seven- and seventeen-year-olds will be equally at home with it, whether creating work books about animals or presenting GCSE course work.

ESM realises that for many years schools will have both old BBC machines and newer BBC A3000s or Archimedes. Therefore, the company has provided a way to bridge the BBC/Archimedes divide as work prepared on the original *Folio* can easily be transferred to this new package. Additionally the concepts of the earlier program are also easy to relate to, particularly through the means of *Simple Screen Folio*.

There is no doubt that the software package will admirably cope with any educational wordprocessing and desktop publishing task.

In addition, teachers and school administrators will value the power of *Desktop Folio* for creating school certificates, guideline documents and reports. It also makes the most of other Archimedes software – *Draw*, *Paint* and *Edit* files can be dropped into frames, and specialized packages like *Snatch*, *FontFX* and *Poster* can be used.

The documentation is well written and clearly presented, and will support new users, whatever their starting point.

PRODUCT DETAILS

Desktop Folio for the BBC A3000/Archimedes costs £90 for the standalone version, £250 for a primary site licence and £375 for a secondary site licence. For further information contact ESM, 59, Abbeygate House, East Road, Cambridge CB1 1DR.

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The ARC/A3000 version contains many powerful features making it very easy to use, i.e. point and click at page numbers. SAE for details.



Reviewed in Acorn User, June 1991

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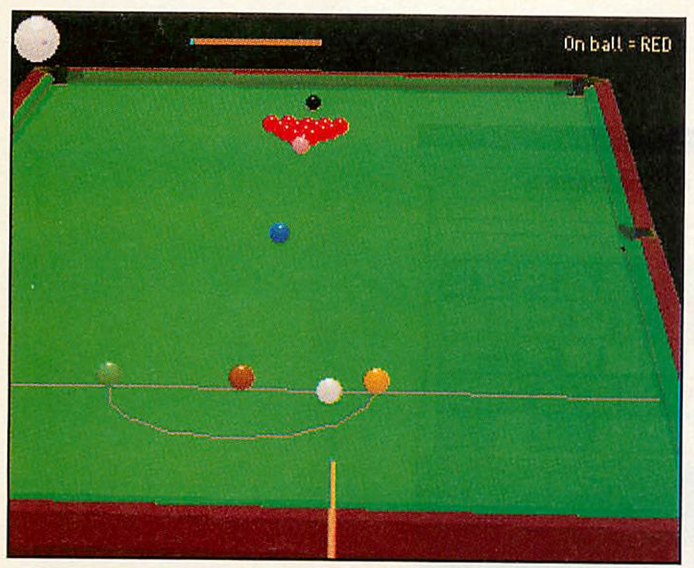
...Remember, price isn't everything!

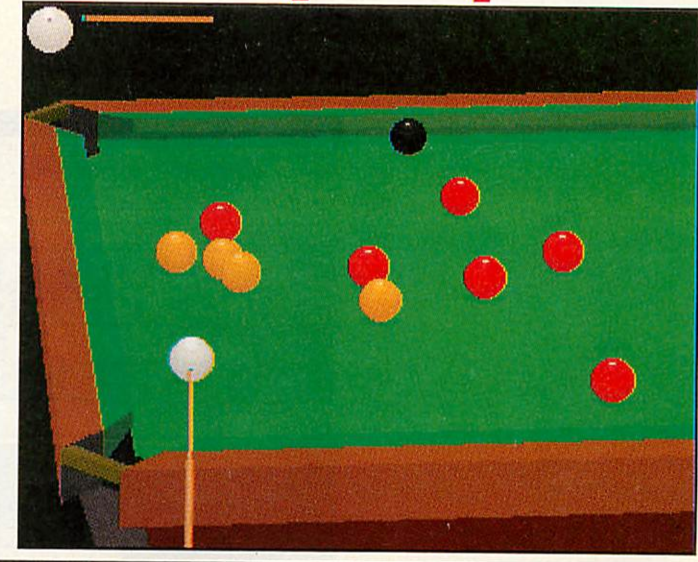
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BBC A3000 / ARCHIMEDES /BBC A3000 / ARCHIMEDES /BBC A3000 / ARCHIMEDES

Break 147 & Superpool



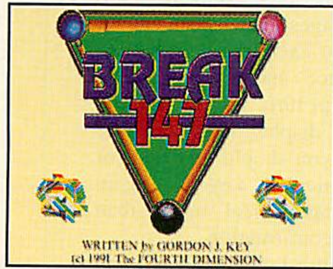


"Snooker & Pool Simulator Par Excellence"









'BREAK 147' and 'SUPERPOOL' are game simulations in the true sense of the word. Gone are the power meters and fixed screw and side settings of inferior simulations and in comes a cue driven by reality software.

As in the real thing your grip on the butt of the cue (represented by the mouse), the smoothness and power of your cue action and the way in which you follow through with a shot, are all deciding factors in whether a pot is successful and whether you will retain position for the next ball. The only thing that is missing is the smokey air and a pint of beer on the edge of the table, these you will have to provide for yourself!

In both games you can choose to play on a practice table where anything goes. You can position balls wherever you wish so that you can improve your potting and positional play. You can even undo unsuccessful shots so that you can try them again. When you make that incredibly fine clip into a pocket or miss by the merest fraction, you can watch an action replay of the shot from any angle so that you can either gloat or see where you made that tiny mistake that let you down.

When you feel that you are up to the task you can play a single match against a friend or against one of the sixteen computer players. Should you feel lazy you can just sit and watch whilst two computer players battle it out between themselves. Alternatively you can enter a tournament where you will have to fight your way through the preliminary rounds and on to the coveted Final.

Whilst you are playing a match or in a tournament the game will be overseen by the referee. If in snooker you are 'on' a colour as in real life the referee will indicate the ball to you that he thinks you are going for and it is up to you to let him know if he is wrong. The referee will also call when a freeball is to be given, if there is a touching ball and your score after each successful shot.



SPECIFICATIONS

256 colour MODE 13 graphics optimized for maximum speed
225k of machine code
Over 147k of high quality sampled speech and sound effects
Ball plotting accuracy of +-0.05 of an inch on a 12 foot table
Cue butt controlled by the Mouse
Bridge hand controlled by Keyboard

BREAK 147
WRITTEN by GORDON J. KEY
(c) 1991 The FOURTH DIMENSION

Super 8 Pool
Written By Gordon J Key
(c) 1991 The Fourth Dimension

BBC A3000 & ARCHIMEDES PRICE £24.95

"Break 147 & Superpool" is compatible with the BBC A3000 and 310 & 400 Series

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TEACH YOURSELF TO TYPE WITH EASE

IN-TUITION

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CHRIS DRAGE discovers an easy-to-use program which brings the skill of touchtyping from the typing pool to the Archimedes

Like most computer users, you are probably not a trained typist, but have gained some keyboard dexterity via a series of one-finger movements. So the skill of touchtyping – which calls for viewing the words you type on the page (paper or screen) rather than staring down at the keyboard searching for each letter – might be something you have thought about acquiring.

In terms of education and training, learning to touchtype certainly falls into the latter category and as such begs a computer solution.

And this is where a new package from Iota, called *Touch Type*, comes in – it offers both an innovative and sensible solution which would be difficult to emulate on any other computer besides the Archimedes/A3000.

SETTING UP

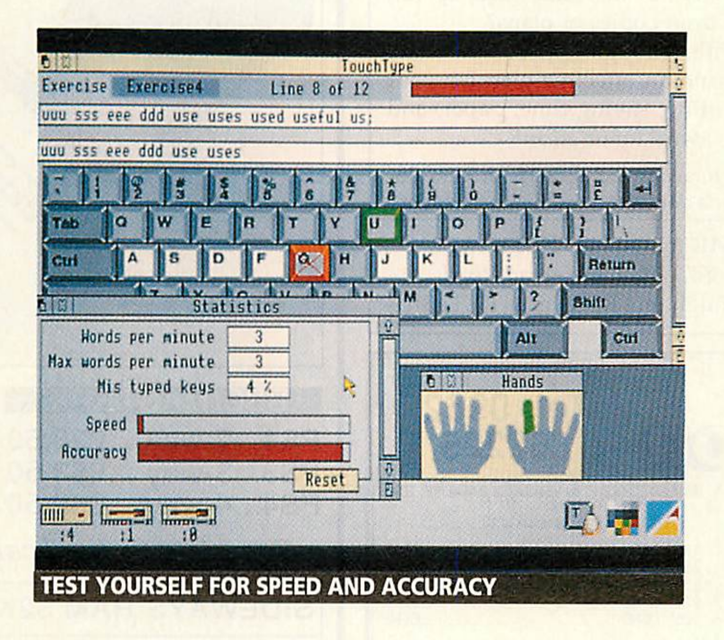
Once *Touch Type* is installed, clicking Select on the icon bar brings up a keyboard display on screen – clicking Adjust displays an option box, which permits all aspects of the system to be selected. Press any key and it will be highlighted on the display screen and, if the Voice option has been selected, the letter will be called out.

There are 45 graded exercises on the disc, all of which are standard text files so that they can be easily edited in *Edit* or a Risc OS wordprocessor and added to your own files. The three sets of practice files include: standard progressive files that take you through from the home keys to using all of the keys; individual finger practice keys that allow you to concentrate on a particular letter or finger, and general typing exercises that contain memos and so on. To load any exercise simply drag it onto the keyboard display window.

Four teaching principles for typing underpin *Touch Type* – the first, and arguably the most obvious, is that you should *never* look at your hands as you type. To this end, *Touch Type* positively encourages you to keep your eyes away from the keyboard. The keyboard display window on the screen shows you which key you have pressed and which key you *should* have pressed, and the CapsLock light is duplicated on the screen as well. I found that it is actually easier to see your finger movements and the relative positions of the keys by looking at the screen.

The second principle is that you should use all of your fingers to type. *Touch Type* encourages this by means of practice exercises designed to introduce and exercise each finger in turn. In addition, the Hands display highlights the finger you should be using for a particular key – again encouraging feel rather than visual confirmation.

The third principle has to do with conditioning your brain so that typing becomes an instinctive action. To help typing become intuitive, *Touch Type* ensures that you see the letter, hear its name and then type it. As you become more



TEST YOURSELF FOR SPEED AND ACCURACY

experienced, you discover yourself seeing the letter, and your finger correctly finding the key, before your brain has had a chance to think about it.

By using a multi-sensory practice environment, *Touch Type* successfully relates the physical action of typing to a number of other stimuli to make typing an instinctive action – a refreshing change from the traditional discipline of a typing school.

Indeed, because *Touch Type* is fun and challenging to use, you tend to want to return to it again and again.

The fourth principle is to provide an accurate assessment of an individual's typing progress, displayed in two ways. There is a statistics window that displays the number of words per minute that you can type, as well as the maximum words per minute. If you take a break at any point the values will vary as it monitors your potential speed, as if you were typing continually.

Incorrectly typed words are displayed as a percentage and both speed and accuracy are displayed as horizontal indicator bars, which can be assessed at a glance.

The aim of touchtyping is to improve on both of these two parameters.

The speed of the Archimedes means that all progress displays can be visible on screen and updated as you type – a feature not found on any other typing tutor that I have ever seen.

Another valuable feature, making the accompanying handbook almost redundant, is the Acorn Help application.

Once loaded, interactive help messages are available explaining all the areas of the windows as you point to them. If you save to a file or print out a file, *Touch Type* outputs the exercise, your text and all your performance statistics.

The program also has an option to ignore mistakes, unlike many other computer tutors which stop and do not continue until the exercise has been correctly completed. By ignoring the mistakes, *Touch Type* encourages perseverance and not impatience.

Similarly, there is an option for copy typing which displays only stars instead of text on the screen. This allows you to practise typing from paper to screen as most typing is indeed done.

Touch Type can be used at all levels from primary school to RSA exam level. However, what may not be immediately apparent is its relevance to partially-sighted, blind and colour-blind people.

Schools for the visually impaired should take note as *Touch Type* offers an excellent opportunity for blind children and adults to learn the skill of touchtyping.

The disc has been designed so that, once inserted into the disc drive, the program can be started by the SHIFT-BREAK method. The notches on the keyboard help locate F and J, the home keys, and with the Voice option selected pressing on any key will cause it be be called out. All exercises are available via the function keys in conjunction with the SHIFT and CTRL keys, and once an exercise is loaded the voice will announce the next letter to be typed.

Where the A3000/Archimedes computer series is so well suited to educational use is illustrated by the availability of stereo sound.

With a set of stereo headphones plugged in, the Voice varies its position according to the letter on the keyboard – thus Q sounds in the left-hand speaker and P in the right. This audio guide helps partially-sighted and blind users to learn the side of the keyboard where a particular letter is located. Similarly, the Voice pitch can be altered going some way to help people with additional hearing difficulties.

Blind people learn to touch-type more easily than sighted people as they are not tempted


LEARNING MADE SIMPLE

to look down at the keyboard and are more accustomed to memorising movements.

CONCLUSION

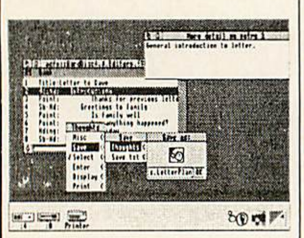
Whether you are involved in education or not, there can be no doubt that *Touch Type* is the definitive typing tutor for the Archimedes series of computers and most other systems as well. For as long as computers use Qwerty keyboards to enter information, keyboard skills are an essential element in the efficient use of the machines that increasingly dominate our lives.

Touch Type takes the hard work out of learning the skill of touchtyping by making the task as pleasurable as possible.

PRODUCT DETAILS

Touch Type for the BBC A3000/Archimedes costs £49.95. For further information contact Iota Software Ltd, The St John's Innovation Centre, Cowley Road, Cambridge CB4 4WF.

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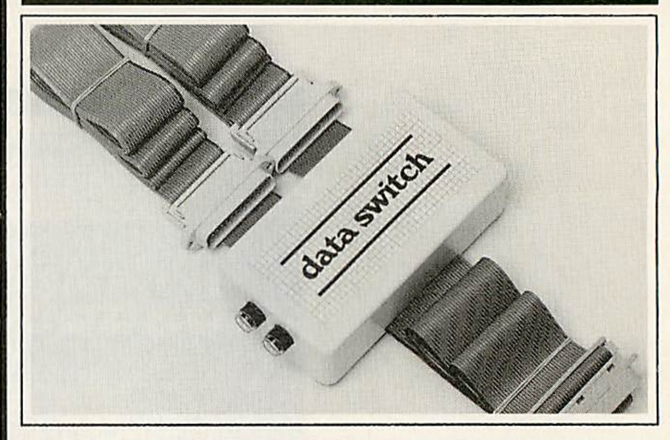
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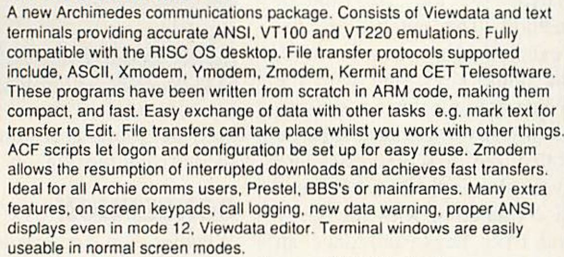
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NEW Archimedes Software

RISC OS Terminals Plus



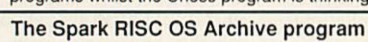
A new Archimedes communications package. Consists of Viewdata and text terminals providing accurate ANSI, VT100 and VT220 emulations. Fully compatible with the RISC OS desktop. File transfer protocols supported include, ASCII, Xmodem, Ymodem, Zmodem, Kermit and CET Telesoftware. These programs have been written from scratch in ARM code, making them compact, and fast. Easy exchange of data with other tasks e.g. mark text for transfer to Edit. File transfers can take place whilst you work with other things. ACF scripts let logon and configuration be set up for easy reuse. Zmodem allows the resumption of interrupted downloads and achieves fast transfers. Ideal for all Archie comms users, Prestel, BBS's or mainframes. Many extra features, on screen keypads, call logging, new data warning, proper ANSI displays even in mode 12, Viewdata editor. Terminal windows are easily useable in normal screen modes.
Programs, manual, case £17.97 inclusive.
(upgrade from disc 24, £11.98 + old disc)

Chess Program for The Archimedes.



A Chess program that takes full advantage of RISC OS, installing itself on the icon bar and running on the desktop in a window at the same time as other applications. You can carry on working with other programs whilst the Chess program is thinking of its next move.

The Spark RISC OS Archive program





Spark, allows you to store files and directories in archive files in a very compressed form. e.g. sprites often take up only 10% of normal space. Files in archives, can be accessed just like files in disc directories. Now Spark series 2, has lots more features. Background operation - archive whilst you do something else. Reads these formats, zoo, zip, lzh, UNIX and Archie Tar, Compress. Reads and writes PKarc, SEA/PC arc, uucode, atob/CET+, FCET and Archimedes archives. 16 bit higher performance compression. Script files, DES data encryption.

Charm - language and development environment



Charm, is a high level language like Pascal or C. This implementation, includes a compiler, linker and assembler, with an editor, and a desktop environment to use them from. The Charm system is both fast and compact. Unlike C, Charm is ideally suited to being used on 1Mbyte and floppy machines. Examples and two full scale demos with source code - an arcade style game, and a desktop Chinese checkers program. Charm produces fast ARM code without learning assembler.

Charm, Spark, Chess, £5.99 each inclusive.
David Pilling, P.O. Box 22, Thornton Cleveleys, Blackpool. FY5 1LR.
Free Air Mail delivery on overseas orders. Extensive range of other Archimedes software available (programmers tools, games, utilities, art), please send for free list.

ArcModem

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The RTFM Joystick Interface

The interface allows up to two 9pin Commodore® or Atari® style joysticks to be connected to your Archimedes/A3000. The interface fits inside your machine, though it does not require a podule slot.

The RTFM Joystick Interface has support from 4th Dimension, Eterna, Krisalis Software, Cygnus Software Engineering, Clares Micro Supplies, Cambridge International Software and Minerva Software.

Over 40 Archimedes games currently work with the Joystick Interface, and you can even control games running under the BBC Emulator!

Only £34.95

Archimedes / A3000 Games

Pon! (**£17.95**, seriously cute, and 9/10 from Micro User)
Brixx! (**£17.95**, the most irritating tune in history, and Micro User gave it 9/10)
Slappit (**£17.95**, ever tried playing football, snooker and pinball at the same time?)
The Arc/A3000 Winter box (**£19.95**, pack includes: Pon in Winterland, Brixx and Zap the Red Wierdos from Mars)
Dominate (**£19.95**, can you find the solution?)
Rekall (**£14.95**, test your powers of memory and deduction)
Bouncer (**£19.95**, fast action arcade game with full screen continuous animation)



RTFM, 43 Hill Street, St Helier, Jersey.
© (0534) 67870, Fax (0534) 68996.



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Archimedes Software Checklist



TITLE	SRP	SALE
1st Word Plus (V2)	93.94	70.45
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Alerion	14.95	11.20
Alien Invasion	14.95	11.20
All in Boxing	14.95	11.20
ALPS System	35.71	32.95
Amazing Ollie (Educ)	16.39	14.95
Ancestry	81.69	61.25
Ansi C (Release 3)	175.08	131.30
Apocalypse	29.95	29.95
Arc-Comm	37.60	37.60
ARC-PCB	195.00	175.95
ARC-PCB Professional	375.00	319.95
Arc Games Controller	41.11	34.95
Arcade 3 Compilation	15.50	11.60
Arcade Soccer	19.95	19.95
Arc DFS	29.95	22.46
Arcendium	14.95	11.20
Arch. Joystick Interface	28.14	26.95
Arch. Operating System	21.95	21.95
Arch. Assembly Lang	21.95	18.95
Arch. Basic Compiler	99.95	74.95
Arch. First Steps	9.95	7.95
Arclight	50.00	37.50
ArcMonitor	25.50	18.95
ArcPinball	25.50	18.95
Arcterm 7	79.95	59.95
Armadeus	82.00	61.50
Armadeus Sound-Samp Brd	154.95	141.95
Artisan 2	61.95	46.50
Astro	23.44	21.95
Atelier	102.12	76.59
Autosketch V2	92.82	69.60
Avon	20.39	15.29
Battletanks	15.28	11.45
Bert Boot	7.95	6.95
Blaston	19.95	14.95
Blowpipe	19.95	14.95
Bug Hunter	18.34	13.75
Bug Hunter in Space	18.34	13.75
Bumper Disc 1 (Educ)	23.95	19.95
Bumper Disc 2 (Educ)	23.95	19.95
Casino	25.50	18.95
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Charts & Graphs	20.39	17.35
Chocks Away	24.95	24.95
CIS Utilities 1 & 2	17.32	12.95
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Concept Designer Pk	28.20	28.20
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Corruption	29.95	11.95
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Dust Cover Arch (K'bd & Mon.)	14.95	9.95

TITLE	SRP	SALE
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D. Cvr A3000 K'bd & Monitor	9.95	
E-Type	19.95	19.95
E-Type Extra 100 miles	16.95	16.95
E-Type Designer	16.95	16.95
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Equasor	57.57	42.95
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Farmer Giles 2 (Educ)	20.39	20.39
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Fish	30.60	11.95
Flexifile	153.21	114.95
Flight Path (Educ)	32.84	29.95
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Fun School 2 (6-8 yrs)	20.99	15.75
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Fun School 3 release for Arc postponed please call for further details		
Gamma Plot	51.03	38.25
Genesis 2	152.75	114.55
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Kiddicad	116.33	87.25

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Let's Spell at home	25.50	20.50
Let's Spell at the shops	25.50	20.50
Let's Spell Out & About	25.50	20.50
Logotron Logo	77.35	77.35
Mad Professor Mariarti	20.39	15.29
Maddingly Hall	15.28	11.45
Magpie	63.45	63.45
Man at Arms	19.95	19.95
Manchester Utd	25.53	18.95
Master Break	19.95	14.95
Maths Pack 1 (5-7 yrs)	12.95	10.95
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Revelation	63.45	63.45
Rhapsody 2 *New!*	61.95	49.95
RISC Basic Compiler	149.95	129.95
RISC Forth	149.95	129.95
RISC-OS Prog Ref Manual		79.00
RISC-OS	34.08	34.08
(Customer responsible for installation)		
Risc Type	20.39	15.29
RoboLOGO	99.95	84.95

TITLE	SRP	SALE
Rotor	24.99	18.75
Scan-Light Jnr A3000	233.83	216.95
Scan-Light Jnr 300/400	222.08	205.95
Scan-Light Senior	468.83	439.95
Schema	135.00	101.25
Search & Rescue	32.84	29.95
Shareholder	195.00	184.95
Showpage	175.07	131.30
Sigma Sheet	51.03	38.25
Slappit	20.39	15.29
Software Dev. Toolbox	233.83	199.35
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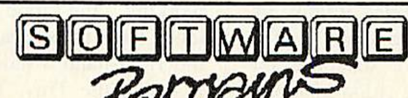
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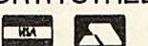
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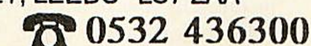
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A POUND OF FLESH

Have you desperately been trying to lose some weight? Or perhaps put some on? If so, now might be the time to consult your Archimedes. DAVE FUTCHER expands

Gaining weight is about calories – eating too many. Slimming is also about calories – eating fewer! Counting calories is the easiest and most flexible way to shed weight. Many people have to, or are keen to, check their calorie intake.

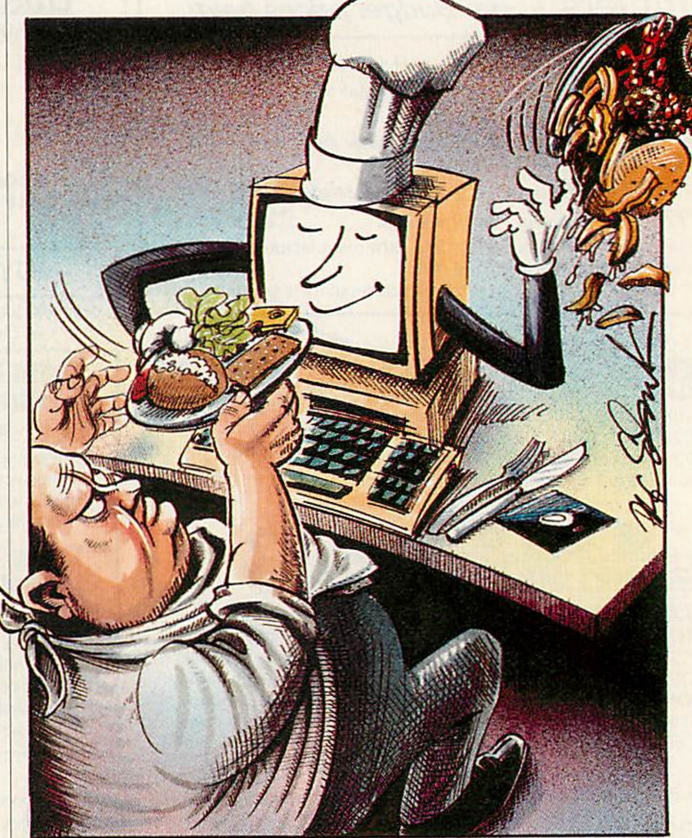
However, looking up foods in books, converting portions into 100 gram units and adding it all together, is usually very tedious. With the publication of the *Diet Manager* this will no longer be the case.

Mike Williams of Mewsoft has built himself a reputation of developing programs to fulfil particular needs. His previous packages include *FaxFile* which provides personal organiser users with a diary, an address book and a page designer; an A4 form designer; and a fancy label program. Now he has provided a tool to help with managing your diet.

The *Diet Manager* has been designed to enable the user to discover the main nutritional components (calories, proteins, carbohydrates, fats and fibre) of individual foods making up our meals. So as well as covering calories the whole question of healthy eating can be included in your diet review.

In true Risc OS style, the *Diet Manager* is installed on the icon bar by clicking the knife, fork and spoon (DietMan) icon that appears in the directory viewer when the disc is catalogued. Once loaded, the application exploits all that the Wimp environment offers. When the icon on the icon bar is clicked on, two of the three main windows of the *Diet Manager* are opened.

The left-hand window is referred to as the Larder, and consists of a number of icons representing the main food categories. Twenty four are provided, and these are very realistic. They cover beverage, biscuit, bread, cake, cheese, ethnic, dairy, fish, fruit, meat, pasta/rice, poultry, pudding, salad, snack and vegetable. There is a sundry category plus a blank category ready for specific user use. The Larder is, in reality, the program's food database; cleverly the foods are grouped into categories and each category is represented by an icon and a name. The database contains nutritional information on over a hundred different foods. This is enough to get you going but any real user will have to add their own foods. Really the program should come with a more extensive database initially, but the food database can be edited or added to and the manual provides help on how to do that.



To get the *Diet Manager* working, the food category icons have to be dragged onto the right-hand window which is called the Tray. To remind you that dragging is needed when the cursor moves over a food icon it changes to a hand. At the left of the Tray are 10 square buttons, which are best thought of as Plates. Categories of food are therefore dragged from the Larder onto

one of the Plates on the Tray.

Once a food category has been dragged to a plate, a food selection window then opens on the left, and the foods for which data exists in the food category database can be examined by scrolling through the list using the up/down arrow icons. Alternatively the window can be enlarged and the desired food clicked, it then appears in the selection slot alongside the plate.

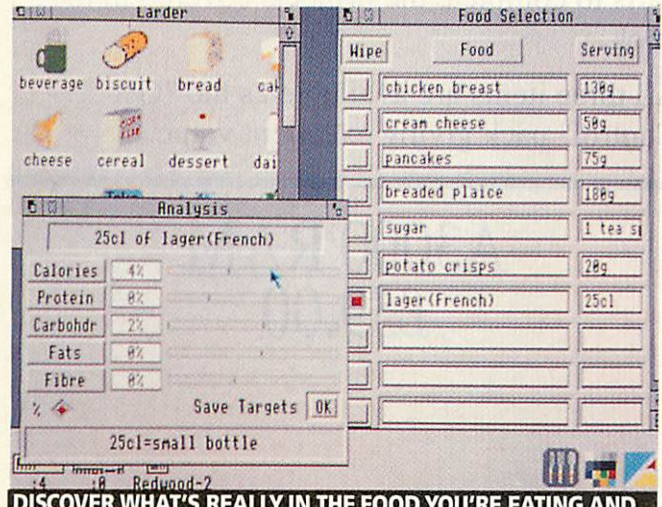
Once a food has been placed on the plate, its name and portion size appear beside the Plate icon. If the Plate icon is clicked using the mouse Select button, the third main window, called Analysis opens. This shows graphically and numerically the main nutritional components of the selected food. These components are calories, protein, carbohydrates, fats and fibre. At the bottom of the window is a percentage icon, which is used to toggle the numerical display between absolute and percentage-of-target display.

Up to 10 foods can be placed on the Tray. This is quite enough for all but the most gluttonous of people.

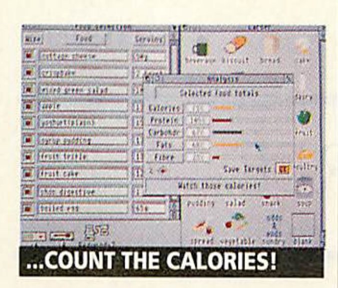
Usefully, by selecting Plates using the Adjust button, the total nutritional values for a number of foods can be added together.

The database food portions are based on what the program author considers to be average portions. These have been sensibly thought out and are normally appropriate.

For instance you will find – one slice of white bread; 60g serving of muesli; 150g serving of yogurt; or a 230g serving of spaghetti bolognaise. However the portions can easily be altered by clicking the mouse in the serving area of the Tray window.



DISCOVER WHAT'S REALLY IN THE FOOD YOU'RE EATING AND...


...COUNT THE CALORIES!

This causes the text caret to appear in the slot ready for editing, thus 100g can be changed to 200g. However, entering 1kg does result in the program assuming you have entered 1g. The changed portion is used by the Analysis procedure in working out the nutrition values.

Three sample meals are provided with the *Diet Manager*. These are Breakfast, Lunch and Healthy.

The *Diet Manager* has a number of options for outputting meal information. All you need to do is click the Menu button anywhere in the Tray window (except over a Plate) and the Output menu will appear. Three output options are available. The meal made up of the selected foods, as shown by the Plate button can be saved as a meal file. A suitable name has to be entered and the file saved in the normal Risc OS way by dragging the meal icon, based on the knife and fork, to your disc directory window. Once saved, the meal can be reloaded by dragging the icon from the disc directory window onto the Tray.

FOOD FACTS

It is also possible to save a nutrition information file on the selected foods in the planned meal as a comma separated value file (CSV).

This option saves each food name, portion and nutritional analysis as text, with a comma between each value and a carriage return to end. After the foods, the totals are output. As the *Diet Manager* is a multitasking application the user can transfer this file straight into another application such as *Edit*, a wordprocessor. If you possess MEWsoft's *A4 Forms Designer* then you can transfer the information onto a well designed form ready for attractive printout. The file could also be modified in *Edit* and transferred to a graph plotting package to produce informative bar charts.

Straight output to a standard dot-matrix printer is also catered for, but the print facilities are rudimentary as it would be expected that the CSV file would normally be transferred to a package more suitable for handling text.

EDITING DATA

Usefully, the food information provided when you click Menu while the pointer is over a food icon lists the available foods in that category, and this can be edited or added to with a limit of 10 foods every time the application is run. This will be alright for most users most of the time, however if you wish to add a larger number of foods you have to work on the FoodData file held in the Resources directory. This is a CSV file and each food entry has the following form:

CATEGORY
food,portion,calories,
proteins,carbohydrate,
fats,fibre,comment

All foods within a category have to be together (preferably, though not necessarily, in alphabetic order). To change nutritional values or add a list of new foods *Edit* is suitable.

However, you must ensure that the new foods are placed with others of the same category. An application like *Pipedream* is better because its sorting capabilities can be used to make the task easier.

CONCLUSION

There are hundreds of books about dieting and healthy eating. These are full of solutions to ease away the pounds or to move to fibre-rich food. The monitoring is left up to you and can prove very difficult and tedious. The *Diet Manager* from MEWsoft is ideal, whatever you are looking more carefully at in your diet.

It will give you the information you need about calories for individual foods and whole meals by a simple drag and few clicks. The package offers a basis upon which to plan a calorie controlled or a more healthy diet and a means of supporting it.

Once again MEWsoft has discovered a little niche in the software market place and designed a very good program to fill it!

PRODUCT DETAILS

The Diet Manager is published by MEWsoft of 11 Cressy Road, Hampstead, London, NW3 2NB. It is available for the BBC A3000 and the Archimedes series of micros. It costs £34.95.



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SCHOOL LINE-UP

CHRIS DRAGE tries out the latest comms package designed for use in the classroom

Just when Archimedes comms enthusiasts were wondering if they were ever going to see Risc OS compliant software, suddenly they are being inundated. *Arcterm 7* (reviewed in *BAU* April 1991) from The Serial Port was the first into the multi-tasking/desktop arena, followed swiftly by *ArcComm 2* and, at the time of writing, a completely new version of Beebug's *Hearsay*.

Of the three, *ArcComm2* seems to have been written specifically with the educational user in mind and that is a refreshing change in itself.

Communication skills are an integral part of the National Curriculum and *ArcComm 2* opens up new opportunities for schools to gain access to on-line systems such as Prestel, Neris, Campus 2000, Teletel, Bildschirmtext and the vast number of bulletin boards containing resources for many different machines.

The package comprises two discs and a comprehensive 58-page handbook. The range of possible curriculum applications is illustrated by examples taken from real schools described in the front section of the handbook – eg, pupils involved in a Bronze Age topic, logging onto Campus 2000 in order to download information from a database to include in their exhibition on the subject.

ArcComm 2 is a completely rewritten program and differs considerably from the original and modest BBC Soft *ArcComm* program. It has been designed to provide the first time user with easy access, while offering seasoned communicators a wide range of sophisticated features. This is exemplified by the Make Campus utility, which allows first time users to create a procedure containing their own Campus 2000 ID and telephone number with the minimum of fuss. You do not have to be a 'wire head' to quickly get to grips with communications with this package.

In common with most comms software *ArcComm 2* offers two basic types of terminal – scrolling and videotext. The scrolling terminals supported are teletype, VT52, VT102 and Ansi which will suit most folk who wish to access systems like Telecom Gold and most bulletin boards. Viewdata terminals are available offering access to the three main types of services available in Europe: Prestel (UK), Teletel (France) and Bildschirmtext (Germany). In addition, *ArcComm 2* offers a variety of popular file transfer protocols for transferring files to and from other computers: Xmodem, Ymodem, Ymodem-batch, CET download and text upload, but not Zmodem.

The system also offers a mailbox editor available for use with the videotext terminals. This works on editable templates of the response and mailbox frames used by Prestel, for example.

Control of the modem is via replaceable modem drivers, a number of which are supplied on disc. There are drivers for many of the popular modems, eg, the Diacom DTI modem, Hayes compatibles and the 'designer' modems (Demon, Voyager, Magic Modem, etc). There should be one driver to suit your particular modem.

Arguably *ArcComm 2*'s most powerful feature is its ability to control the program via procedures, or 'script' files. By creating a suitable procedure you could, for example, get *ArcComm 2* to automatically dial Telecom Gold, log on, download all new mail, log off again without having to do any more than double-click on the procedure's icon.

In educational terms, this feature offers significant advantages – it allows the IT co-ordinator or authority-based advisory teacher to distribute customised procedures to schools which have little or no knowledge of communications software. Such 'click-and-go' software should prove very popular, since new procedures can be written and added to the library as and when school needs change.

Once installed, *ArcComm 2* places two icons on the icon bar – one on each side. The left-hand icon is for file transfer operations while the right-hand one opens the main *ArcComm 2* window. Options available from the main menu allow you to select the type of terminal and open an appropriate window, centralise the window to the screen and automatically select the best screen mode for the terminal selected. These parameters may be saved as a default status for future use, although using a procedure is a more convenient method.

Once a terminal is selected, its window appears on-screen. This behaves in the accepted Risc OS manner, but can be moved around the screen by clicking and holding the Adjust button on the mouse and it can be automatically centralised by double-clicking – a feature I would like to see as an accepted part of conventional Risc OS. To help fit terminal screen windows onto

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"The programming language and the compiler enables the joystick....to be used to control virtually any piece of software. Since the RTFM interface does not do this, The Serial Port's effort is the best buy of the two."

Acorn User February 1991

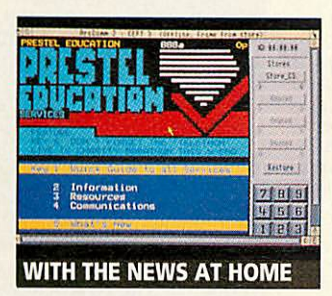
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the screen with room to spare, a Newmodes module is supplied to give larger physical desktops for standard and multisync monitors.

The Risc OS Colours module is used to provide the closest colours to those actually available in non-optimum modes and the software copes reasonably well with the Ansi 'bright' attribute. Similar control is possible over the keyboard with a replacement ISO1 keyboard driver, supplied to allow easy production of accented characters.

ArcComm 2 offers a good deal of direct control over the modem itself via two pop-up menus and replaceable modem drivers to handle things like the speed of the serial port (baud rate), setting up the modem and direct dialling of telephone numbers. The 11 drivers supplied should mean most schools will never need this feature, although it does ensure that new modems can be catered for as they appear on the market.

Another interesting feature is *ArcComm 2*'s ability to log details of calls (as many fax machines do). A text file called Calllog is created, which can be loaded into a wordprocessor and printed out, or it can be turned off altogether if not required. For those of us who remember the days of using *FX7/*FX8 to set the baud rate and data format, *ArcComm 2*'s series of set-up dialogue boxes are a joy. However, for frequently used numbers, dialling from procedures is a far more convenient method.

ArcComm 2 procedures preserve the current state of the program in a file, saving a considerable amount of time in setting up the program in frequently-used states as you only need to save all the settings once – thereafter, you simply run the procedure. The parameters which can be saved in a file include terminal type, baud rate, character sets and modem driver. A particular use of procedures is to automatically log on and upload or download files/messages once the number has been dialled and the host has answered. A number of example procedures are available on the release disc which can be adapted and altered to suit requirements.

A 'Make Procedure' dialogue box is used to save a procedure. Here the necessary telephone number can be entered and the auto redial and 'best mode' buttons can be selected. Procedure files can be loaded into *Edit* in order to add anything you want to them. There are 19 keywords available which provide automatic control over such tasks as signing on, passwords, uploading and downloading files, storing frames, etc. A typical section of script may look like:

```
WAIT 600, "IE" SEND "1234567890" WAIT 600, "PASSWORD" SEND "BAU"
...etc
```

An interesting keyword is GetResponse which makes the procedure wait for a response to something which has been sent and stores the reply in a variable called Response$. This variable can be acted upon by the Case...When...Otherwise... Endcase and the While... Endwhile constructs. Response$ can also have =, <, > and use Boolean AND and OR operators. Although the procedure language is very flexible and provides considerable control over *ArcComm2*, it cannot compare with the more powerful scripting language available through *Arcterm 7*.

ArcComm 2 handles both CEPT terminals (Prestel, etc) and scrolling terminals very well, providing all the features you would expect with one or two interesting additions.

Three on-screen keypads in French, German and English are available to suit the language of the appropriate terminal and a Campus mode is available when using the CEPT3 terminal which selects whether the switching codes used by Campus 2000 system are recognised or not. This makes accessing Campus via the Prestel gateway completely transparent and toggles automatically between viewdata and and VT102 scrolling under control of the Campus host.

Similarly, colour can be switched to a monochrome display to obtain better looking French Teletel screens.

Up to four frame stores may be open simultaneously in which to save frames and a mailbox editor is provided for editing mailboxes and response frames for later uploading with the mailbox uploader. Screens may be saved as text or graphics (sprites) with standard Risc OS save-file dialogues.

Similarly, screens may be printed directly as text (Epson-compatible printers) or printed complete using standard Risc OS drivers.

Printing to a file would allow you to do all the printing once *ArcComm 2* is terminated – at a later time, for example.

A similar range of features is available for scrolling terminals with controls for wrapround, line feeds, local echo, Xon/Xoff, inverse and printer and host printer.

Files can be stored on disc directly by 'spooling' incoming data to one or two active file stores. As above, screens may be printed as text directly via *ArcComm 2* or saved as either text or graphics for use with other Risc OS applications.

CONCLUSION

ArcComm 2 is just the software schools need to communicate effectively with the minimum of fuss. It has been deliberately designed for this application – and it shows.

It can be set up so that all the user is aware of is a procedure that must be clicked-on in order to dial, log on and perform whatever tasks are required. The technical aspects are sufficiently removed to enable teachers and pupils to concentrate on what really matters – the interchange and manipulation of information. The ease of access to the French Teletel and German BTX systems could provide an invaluable 'live' resource in modern language courses.

Arcterm 7, with its extremely powerful 7Script language, is under constant development and evolution and will probably always be the 'state-of-the-art' comms software for Risc OS. The new version of *Hearsay* may well eclipse *ArcComm 2* in terms of the facilities it offers and, like *Arcterm 7*, will directly compete for the serious communications enthusiast. Price will probably determine choice.

ArcComm 2 represents good value for money and schools interested in delving into electronic communications world of Email, on-line databases, viewdata, telesoftware or simply computer to computer communication would be well advised to look carefully at it.

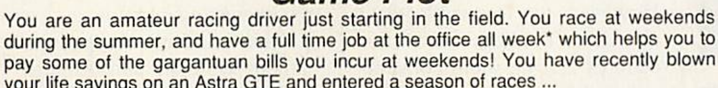
PRODUCT DETAILS

ArcComm 2 for the Archimedes costs £54 and is available from Longman Resources Unit, 62 Hallfield Road, Layerthorpe, York YO3 7XQ.

Saloon Cars









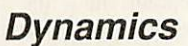
Combining the best features of a fast and furious racing game with the realism of an accurate driving simulator. Work your way up through the leagues, buy extra features and faster cars, to become the Saloon Car Racing Driver of the Year.

Game Plot

You are an amateur racing driver just starting in the field. You race at weekends during the summer, and have a full time job at the office all week* which helps you to pay some of the gargantuan bills you incur at weekends! You have recently blown your life savings on an Astra GTE and entered a season of races ...

With your Astra you compete in class C against the other Astras and, if you prove yourself worthy by working your way up through the league, you may eventually manage to get sponsorship to race in class B. At this point you will need to buy a BMW M3, built to your exact specifications and the manufacturer's custom price. After a few more seasons you may even reach the exalted heights of a Cosworth Sierra ...

*It is beyond the scope of this program to provide a realistic simulation of a full time office job!

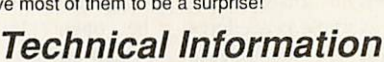


Dynamics

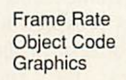
The mathematical simulation of the dynamics of a car in motion was set up by a professional physicist. A Classical Newtonian model is used for the transmission and to model the motion of the wheels on the road in both regimes of sliding. The result of all this is a program realistic enough to allow front, rear and four wheel slides, Understeer and Oversteer and of course handbrake turns.

Graphics

The game features 256 colour, mode 13 graphics, designed by a professional artist. The view is a first person, cockpit view from which you can see the road ahead, the rear view mirror and instruments. The main view features totally customised handwritten ARM code graphics routines which were necessary to maintain the superb frame rate and create a view previously undreamed of. The courses (Silverstone & Brands Hatch) feature bridges, stands, gravel traps, barriers, the pit lane, and even the man with the chequered flag. Of course there are many other features, but we think its better to save most of them to be a surprise!



Technical Information



Frame Rate	Up to 25 FPS
Object Code	250k of Handwritten Arm Code
Graphics	256 colour, mode 13 graphics Handwritten custom graphics routines
Sound	Digitally sampled sound effects (Naturally!)
Computer	Any Archimedes with 1Mbyte or more
Inputs	Mouse, Keyboard or Joystick
Serial Link	This option will be supplied on a separate disc This will hopefully be available in October '91





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IN SEARCH OF THE MISSING LINK

PAUL JAMES looks at Pres' new option for transferring data between two Arcs

We have published a few programs in the past which allow the transfer of data from one machine to another – BBC model B to Archimedes, Macintosh and PC, Psion to Archimedes and BBC, and so on.

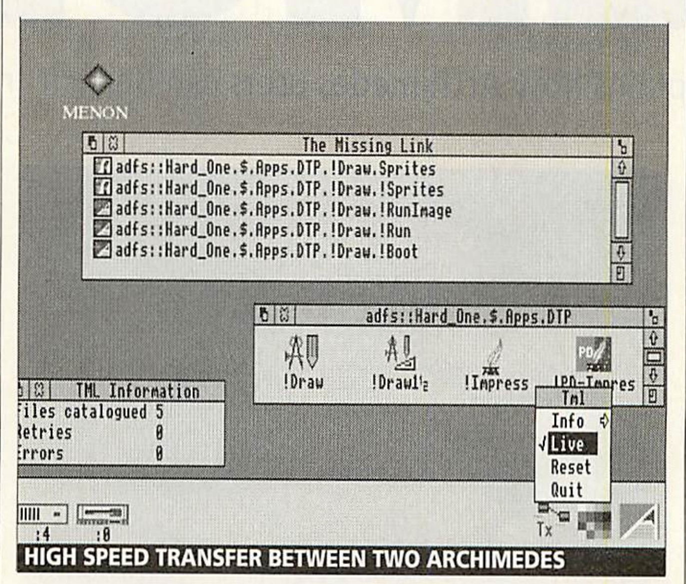
These programs have generally involved the use of the RS423 port and, in most cases, transfer has been rather slow.

The Missing Link from Pres is intended to provide high speed data transfer between two Archimedes – albeit at a rather high price.

The package consists of two small black boards, a cable and a disc with the necessary software on it. The boards plug into the Econet adaptor inside each machine. The components are hidden under a black PVC film so that neither you, nor anyone else, can see what makes the Missing Link tick.

After inserting the boards and connecting the computers (in this test, a BBC A3000 and an Archimedes 310) via the Econet sockets, I ran the application on the disc called TML_Test, which reported that the link was working. Running the TML_Chat application sends keypresses from one computer and duplicates them on the other. This application is not multi-tasking, being a simple Basic program (like the one in our July Comms feature), demonstrating how to write your own programs for the Missing Link. A multi-tasking version would be more useful.

TML is the main application on the disc which allows you to send complete files, applications or the contents of hard discs down the line. The application can have one of two states – live option on or off. When the live option is selected, the hardware is communicating all the time, sending and receiving 'I'm here' messages – of course, this slows the machine down, so in normal use you would leave this option off. Dropping a file onto the icon or a TML window in this 'live' state sends it down the cable immediately, providing the other computer is also 'live'. If not, then a 'Link not found' error is reported.



HIGH SPEED TRANSFER BETWEEN TWO ARCHIMEDES

If you have your application 'turned off' and drop a few files onto the TML application, the filenames that are waiting to be transmitted are displayed in a window – these are not sent until the live option is ticked.

The default destination for a file is the root directory of the current filing system, but you can redirect the data you receive to the filing system and directory of your choice. A hard disc is the obvious choice, but there is a danger of the other end sending a file that overwrites a file that's already at this destination.

For my tests I received files into a Ram disc I had set up, and larger transmissions went into a directory called 'In' on my hard disc.

Whole applications arrive ready to run and do not lose their access attributes. The link seems very reliable and the only errors I could generate were those connected with the software, which isn't really up to scratch – certainly I would have expected better for the price tag. The way the software is at the moment you need to be able to talk to the person on the other machine. It should be possible to have a little window to tell you if the other end of the link is established.

The link is certainly fast – a combination of the fact that the protocol has none of the overheads of network packets and some very fast circuitry.

For a simple timing test I took several files, totalling 300K of data, and transmitted them between machines. The time for Econet was 29.34secs. However this was on the large network we have here at Redwood Publishing, on a smaller network I would expect a time of around 15secs. Apple Local Talk took 20sec to read the file into a Mac. The Missing Link transferred the files in just over nine seconds.

Data is sent simply as a constant stream of bytes, with a start and stop bit. Simple checksums are done invisibly, even to the programmer when using the SWI calls available. The software supplied is immature, but has a wide scope for improvement.

Currently the Missing Link offers only very specialist use, but Pres plans to expand that use in two further stages of development. First, remote access – this software upgrade will enable remote control of an Archimedes from a distance. Second, a podule with eight outputs will allow up to eight Archimedes to be connected to a central 'fileserver', allowing access to its hard disc. The most obvious use for this star network would be desktop publishing. Econet or Ethernet may offer better networking facilities, but Pres' system would be slightly faster and far cheaper than the latter.

The Missing Link is obviously a clear winner where speed is concerned – but would you have a use for it?

PRODUCT DETAILS

The Missing Link for the BBC A3000/Archimedes cost £164.50. For further details contact Pres Ltd, Box 319, Lightwater, Surrey GU18 5PW. Tel: (0276) 72046.

MEGA MEMORY

TOM CARRION explains how Archimedes users can benefit from 8Mb upgrades

When Acorn designed the Arm chip set (Arm, MEMC, VIDC and IOC), much thought went into making it as expandable as possible. Of the four chips, you can now buy a number of direct replacement upgrades for two and an enhancher for VIDC.

The Arm 3 provides an on-chip caching system which gives a five-fold increase in processor speed.

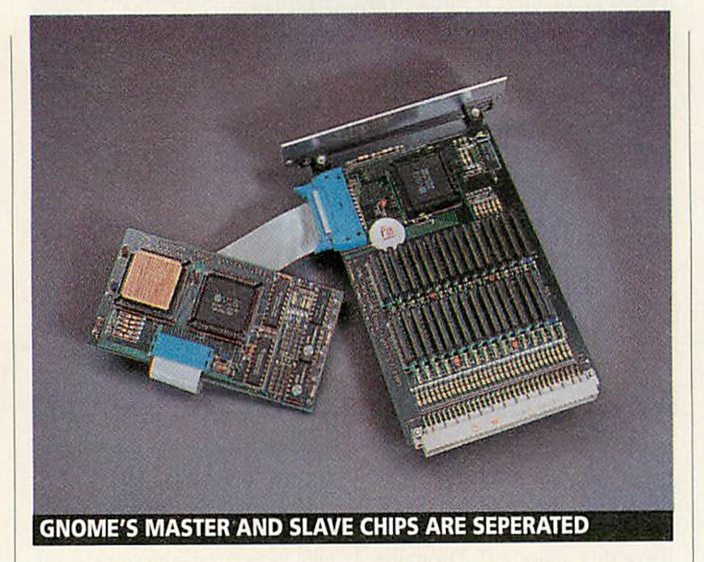
The MEMC1a speeds up memory access by about 10 percent and improves the performance of certain instructions, such as multiply.

Although the Arm processor can address up to 16Mb of Ram, MEMCs are only capable of addressing a maximum of 4Mb – hence the 4Mb supplied with A440.

Three upgrades – from Watford Electronics, Atomwide and Gnome – are available for 440s which make use of daisychain-able MEMCs. All provide an extra MEMC with 4Mb of Ram which, combined with the 4Mb on board, gives 8Mb in total. The 410s and 420s must be upgraded to 4Mb internally before any of the upgrades can be fitted.

No provision has been made for adding further MEMCs, although this would be theoretically possible.

All three upgrades require your machine to be extensively dismantled before fitting – so much so that they are really a dealer-only upgrade. Atomwide includes courier collection, fitting and delivery of your machine in the price.



GNOME'S MASTER AND SLAVE CHIPS ARE SEPERATED

I can immediately think of two areas for which 8Mb would be useful: Unix (ie, RiscIX) and professional desktop publishing work. For the latter, it is a real advantage to have a 1Mb font cache (for speedy screen updates), a 1Mb Ram disc, 1Mb RMA, the DTP software, *Draw* and *Edit* all loaded at the same time and still have enough memory for 600dpi output via a Laser-Direct printer! Specialist animation work could possibly benefit from the extra memory – you can store 50 mode 15 screens in 8Mb without compressing them.

Combatibility with existing hardware is an important point when fitting an upgrade. Watford's card sits in between the drive mounting bracket and the back plane and plugs into both the Arm and MEMC sockets on the main board.

For this reason it can only be fitted to 400/1 series machines – during Acorn's redesign for the 400/1, Arm and MEMC were moved about half a centimetre further apart so the socket headers on the Watford card are slightly too far apart to be plugged into an old style 400 machine.

Once the card is installed, the Arm processor itself is removed and sits in an A2 'processor card' which plugs onto the side of the Ram board. If you wish to use an Arm 3, then you need a Watford A3 card (which has the Arm 3 fitted) – you *cannot* use any other third party Arm 3. Watford will exchange existing Watford Arm 3 cards free of charge for the appropriate A3 processor card.

The memory comes in the form of four SIMs each containing nine 128K DRAMs (the same chip used by Gnome). In fact only 32 of the 36 DRAMs are used, even though all are powered. Power for the card (including those extra four Ram chips) is taken (via 'piggy-back' spade connectors) from the backplane which may put a lot of strain on the power supply on heavily loaded machines.

Both the Gnome and Atomwide upgrades consist of two cards – a 'header card', which plugs into the MEMC socket and a half width podule containing the Ram. This solves the Arm 3 compatibility problem, as nothing is being plugged into the Arm socket, and relieves the burden on the backplane's power supply. However, you lose podule slot



THE BEST FROM ATOMWIDE

two which is the co-processor slot and is the only slot that has access to the full 32-bit data bus.

Atomwide currently has a prototype Ram card that plugs into the Rom sockets on the main card instead of a podule slot – you then plug your Risc OS Roms into sockets on the Ram card. The sockets provided can take up to 4Mb EEPROMS (as used in 400/1 and 540s), not usable in a 440 without a bodge board. This version of the upgrade should be available by the time you read this.

A major difference between Atomwide and Gnome units is in the positioning of the master and slave MEMCs. In the Atomwide design, both are mounted on the header card, whereas the Gnome has the master on the header card and the slave on the podule. Gnome's board uses 32 128K DRAMs, but Atomwide's has eight 512K devices.

Due to this two board design, both the Gnome and Atomwide upgrades have a ribbon cable connecting the two cards. Atomwide's is 34-way with interleaved earth (see below). It goes through quite an interesting contortion to get past the backplane connector, but safely reaches the Ram card and plugs in nice and firmly. Gnome's cable is 40-way, has no interleaved earth and only just reaches the connector on the Ram card – it was quite a tricky maneouver to get it plugged in.

IN OPERATION

Once installed, all three boards function as expected. Turning the machine on produces the initial message 'Risc OS 8192K' followed by some ludicrous amount of bytes free for Basic. Reset now takes slightly longer than before as the OS is checking twice as much memory.

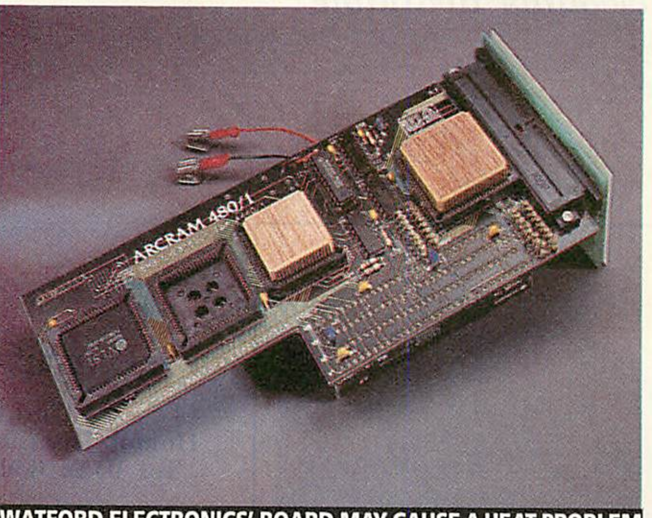
Due to a bug in Risc OS, the desktop does not function correctly with 8Mb fitted – it crashes with an abort on data transfer. All the upgrades provide three Acorn-licenced replacement modules and loading these from the command line before issuing a *DESKTOP command cures this problem. Previously I had an obey file called *DES in my library to install various applications automatically on my desktop so it was trivial to add in the relevant RMLoad commands.

Apart from this, there is really very little to say about using the extra memory. The task switcher correctly displays a bar 8192K long, and you can create a 4Mb Ram disc and type DIM A(1611196) in Basic (even if it does take 4.5sec). Watford supplies a *FourMeg command which disables the extra memory until you perform a power-on reset. This, the company says, is useful for testing program compatibility with 4Mb machines. In fact, it is not possible to totally emulate a 4Mb machine as you will still have two MEMCs. The closest and simplest you will get (which will work on all the three boards) is to configure a 4Mb Ram disc.

Apart from the compatibility problems outlined above, there are two other major areas of criticism. The first is levelled squarely at the Watford card (although the others are not totally innocent) and concerns heat. Within the case of an Archimedes there is precious little air circulation – only four air vents and a small fan. The only spare space is reserved for the podules.

The Watford card is located right above the on-board memory and, most importantly, sits right behind the floppy disc drive which is only guaranteed by Acorn up to 50°C. The two MEMCs are mounted on the underside of the card which doesn't really encourage heat dissipation. Quite alarmingly the processor card half blocks off the front right air vent and perhaps worst of all the four SIMs (containing the actual Ram) are mounted very close together on the top of the card and have the floppy drive ribbon cable running directly over them. Whether all the heat generated will actually cause a problem is debatable, but I would not like to use a card like this in conjunction with a SCSI or Ethernet card for any period of time. Gnome and Atomwide's two board design does at least produce heat where heat is allowed.

The second major criticism really falls on the Gnome board. Remember what I said about synchronising the MEMCs and how important it is? Well, the Gnome card has the master and slave chips separated by 6in of ribbon cable and a couple of analogue delay lines. As with the heat problems above, whether this physical separation of the MEMCs will cause any problems is difficult to say – it just might when you're doing something important. The fact that the ribbon cable carries the entire address bus and is not interleaved earth means there may be a fair amount of RF interference produced – this may be a problem in certain areas.



WATFORD ELECTRONICS' BOARD MAY CAUSE A HEAT PROBLEM

The Atomwide cable is interleaved, which simply means that every other wire in the cable is connected to 0V – in other words, only 17 of the 34 'ways' of the ribbon cable are actually used for data, while the remainder are grounded.

Other points to note include quality of construction and attention to detail. All use four layer boards, but only Atomwide's card has purpose made header plugs to plug the card into the board. It also seems much simpler, neater and uses less components than the others, which is a very important point when heat dissipation is a major consideration. Gnome's podule has a fixed backplate, whereas Atomwide's can be adjusted according to the position of your backplane. All in all, Atomwide's has the air of quality about it.

CONCLUSION

All three cards have advantages and disadvantages and they all are quite expensive.

It doesn't take too much arithmetic to work out how much a board like this actually costs to build and therefore how much profit is being made, so it's really nice to see that Atomwide has at least come up with a product using quality components and shown that a lot of thought was put into the design stage.

For most people, £500 to £600 is an awful lot of money to spend on an upgrade (you could buy a whole A3000 for less!), so many could just plump for the cheapest and not really care about what may happen if it works.

However, if you care for your machine, I would pay the little extra and buy an Atomwide card, especially when the 'poduleless' version appears.

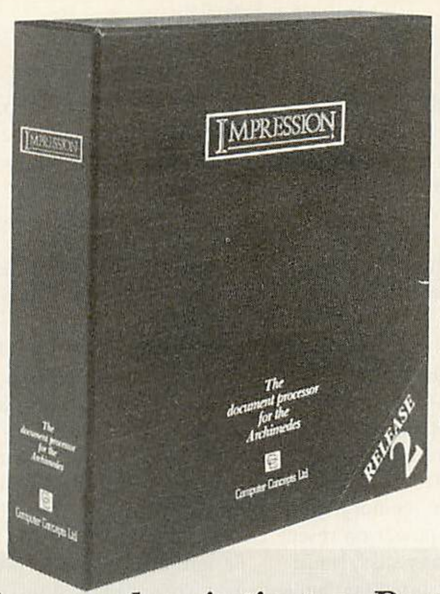
PRODUCT DETAILS

Watford 8Mb upgrade costs £579 (£954 with Watford Arm 3). Contact Watford Electronics, Jessa House, 250 Lower High Street, Watford WD1 2AN. Tel: (0923) 37774.

The Gnome 8Mb upgrade costs £700 (£1027 with Arm 3). Contact Gnome Computers Ltd, 25A Huntingdon Street, St. Neots, Cambs PE19 1BG. Tel: (0480) 406164.

The Atomwide 8Mb upgrade costs £649 (£949 with Aleph One Arm 3). Contact Atomwide Ltd, 23 The Greenway, Orpington, Kent BR5 2AY. Tel: (0689) 838852.

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BATTING ORDER

DAVE FUTCHER is bowled over by this cricketing database for the Beeb

This summer sees the West Indies back in England and an exciting test match series is in progress. However, there is an enormous amount of cricket played competitively below the level of test and county cricket. The game is played by thousands of people from mid-April until the end of September.

Cricket is about getting runs, bowling and fielding. In all matches, official scorebooks record the details of every ball bowled and run made as well as summarising the runs made by individual batsmen and the wickets taken by the bowlers.

Some clubs keep records of past weeks' performances and build up a record over the weeks that make up the cricket season. It all depends on loyal members who toil over the scorecards of previous games, plotting highest scores and working on averages.

It's a task crying out for a bit of help from a piece of computer software!

Two Devon cricket playing programmers have come to the rescue with the *Cricket Database*. This is a suite of programs designed to store, retrieve and present the data on screen and on paper.

It's an ideal package for keeping permanent club cricketing records and for helping with team management.

HIGH SCORES

Personal record keeping is handled very well by the program. A series of entries can be built up about individual players which can then be viewed or printed out individually or as a collection. Entry is password protected to ensure that the information is secure. Each player's entry is split into batting and bowling sections. Initially, this is set on batting and the Page control toggles to the bowling details and if pressed again returns to the batting. The View control is useful for browsing up and down the matches played.



Illustration by Helen J Holroyd

On the batting screen extra information is displayed which relates to the total number of runs to date, the overall high score, the number of times out and the overall batting average. Cleverly, when you browse backwards through your matches you will see that these figures change as they refer to the total reached when that particular entry was made. The most recent entry will have the up to date details.

The bowling page shows the match information relating to bowling and also calculates the performance. It is important to realize that the bowling figures relate to this individual match only and isn't a running total. The computer calculates the runs per wicket, the balls per wicket, the number of balls bowled and the runs per over.

PICKING THE TEAM

At my cricket club, Monday evening is team selection night and team captains and club officials try to pick players on the basis of past performances. This is based on batting and bowling ability and availability on a particular day.

Many cricket clubs will find the Team File printing option of considerable value for team selection, as this will allow the complete batting, bowling and fielding records of a team to be printed out. In the case of batting it will be displayed with the highest average first, and in the case of the bowling in the lowest match average, ie, the lowest runs per wicket bowler. Up to 15 players' batting and bowling statistics can be fitted on to a single sheet of normal fanfold paper with the fielding figures on the following sheet.

The scorecard facility is a completely different method of storing match information, and is in reality an electronic version of the pages of the official scorebook used for the match. Once the information has been entered, a printed copy can be obtained for display in the club house, sent to the local paper with the match report or even added to the club's annuals. It's an ideal way of presenting permanent records of a match.

Although the *Cricket Database* comes with an extensive user guide, it also has an online help facility.

These on screen help pages are provided as a quick reference to the use of the system disc and despite the memory limitation of the BBC micro they are quite comprehensive.

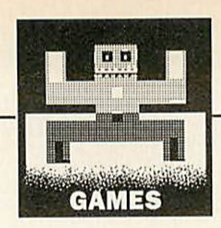
CONCLUSIONS

With the *Cricket Database* more detailed and useful records can be kept with the minimum of effort. It is user friendly and simple to operate. A clear display style is used throughout and the function keys are put to good use.

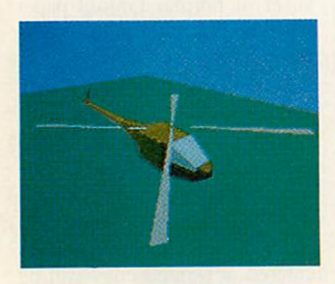
The package was originally designed to be used by students, so anybody with even the minimum of computer know how should be able to master it quite easily.

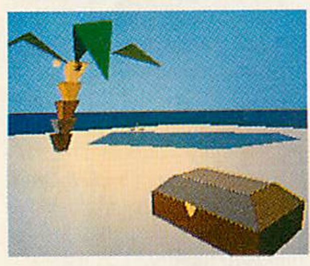
PRODUCT DETAILS

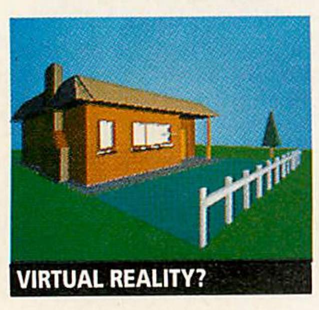
The Cricket Database is published by Marli Software, 40 Jean Crescent, Higher Compton, Plymouth, Devon. It is available for all BBC micros (eight-bit) and costs £24.95.



GAME SHOW







VIRTUAL REALITY?

COMPETITION

We've got £30 vouchers from the Fourth Dimension to give away to the first five readers who can write in and let us know what type of plane you fly in Chocks Away.
Eterna has also given us five copies of Fine Racer to present to the first readers to let us know what team Nigel Mansell drives with. Send your entries to the Games Page, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ. (Note: the same person cannot win both prizes).

The games market is beginning to liven up considerably. I think this Christmas will be a significant milestone on the way to matching, and then overtaking, the 16-bit games success story. But it isn't just the big names that should be producing quality games this year – the first portion of the long awaited space game *Karma* from Periscope Software will appear in December. It will be sold in two separate parts so that Periscope can be sure of releasing something before Christmas.

In May Virgin Software released *Wonderland* for the Archimedes and plans exist for other games from Virgin this year. Ocean will soon be publishing the Arc version of *Puzznic*, a coin-op arcade game from Taito. *Puzznic* is yet another game which is similar to *Tetris* and involves positioning blocks to make them disappear.

The highly successful *Lemmings* game that was so popular in the 16-bit world last Christmas will be released on the Arc by publisher Pysgnosis this Autumn.

Of course, Krysalis Software is generating a steady flow of quality Acorn games – we can look forward to *Mad Professor Mariarti 2, Hill Street Blues, Manchester United FC 2* and *Jahangir Khan's Squash* all before Christmas.

Last but by no means least, Domark has a healthy 32-bit schedule to cover the next couple of years at least.

Following the release of *MiG-29 Fulcrum* earlier this year, there are plans for two further flight simulators for this Christmas and next, both written by the authors of *MiG-29* and the two *Inderdictors*.

Domark will be offering existing owners of *MiG-29* a chance to cheaply upgrade their plane to the new *Soviet MiG-29M* fighter – a plane that in real life will be 'sneak-previewed' at the Paris air show in September, a date that happens to coincide with Domark's launch of *MiG-29M SuperFulcrum*.

To the average mortal the *SuperFulcrum* game doesn't sound remarkably different from the original, but to flight enthusiasts there are small but significant changes.

The Soviets have apparently redesigned the cockpit to be transparent in most directions to afford the pilot greater visibility, the engines are more powerful and the old dials have been replaced by digital displays. Look out for this in September both as a full price title and an upgrade.

The other flight sim under development is based on the Harrier jump-jet. This will be more of a strategy game than a simulator, but will not be out until Autumn 1992.

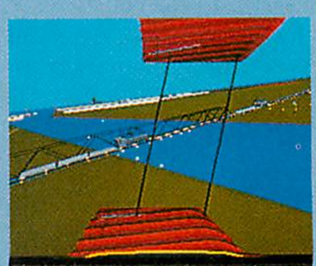
However, before that, Domark has another surprise in store in the form of a game called *3D Construction Kit* (exclusively previewed in last month's news pages) which has already been released on the major formats.

Sub-titled 'build your own virtual reality', it involves constructing a landscape using 3D modelling tools (similar to Ace Computing's *Euclid*) and then being able to walk or fly around it.

Sam Greenhill

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The Fourth Dimension.Tel: (0742) 700661.
Archimedes/A3000 £19.95 (£39.95 including original Chocks Away)

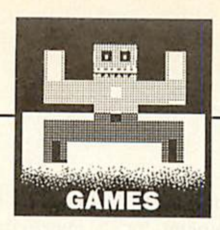


CHOCKS AWAY FLIES HIGHER

I reckon *Chocks Away* is probably still the best game available for the Archimedes/A3000. It essentially involves flying around in a World War 1 bi-plane blowing things up, watching out for ground gun fire and enemy aircraft.

The original game was made a bit faster by The Fourth Dimension in January and owners of the Mark 1 version are offered a free upgrade. But *Chocks Away Extra Missions* is different, certainly not a mere upgrade, and it requires the Mark 2 version of the original *Chocks* to make it run.

Essentially the *Extra Missions* offers several significant improvements to the graphics and gameplay to warrant the extra cash. The plane is also slightly different in that you can be shot about 100 times



more than you could with the original before crashing. The catch is that you *are* shot about 100 times more!

The air is full of flak on most missions and the abundance of enemy aircraft show little mercy.

Extra Missions provides 16 new maps to complement the original's three, and these contain, among other things, residential streets, railways, rivers, bridges, piers, trains, barrage balloons and oil rigs.

The extra missions are very good fun to play and if (like me) you completed all the missions on the first version you will appreciate the way that each mission is quite different from the last.

In terms of difficulty, the first extra mission corresponds to about mission 10 on the original and the last extra mission – well, I can't get there.

One of the main new features is the 'camera' view points. There are very few places from which you can't view your plane, since you are able to watch the goings-on from enemy planes and numerous tracking cameras.

A real boon for the game is the serial link up, in which you may play the two player missions using two computers, both at full screen. You will need to buy a lead for this from The Fourth Dimension, but be warned – you are likely to experience teething problems when trying to get this feature to work. In fact, it won't work at all on the early Archimedes 310 models.

There is plenty more to say about this game and no doubt a glance at the advertising pages will prove fruitful. I would buy it. My only niggles are that it is still pretty slow unless played on an Arm 3 upgraded machine, and the keyboard is a bit less responsive when using the serial link option.

Other than that, *Extra Missions* complements the best game perfectly.

Sam Greenhill

CHESS 3D

Micropower. Tel: (0532) 458800. Archimedes/A3000 £19.95

As its name suggests, *Chess 3D* is displayed as a three dimensional chess game.

This has been quite cunningly achieved by scaling pre-drawn sprites of the pieces, depending on their positions on the board.

The board can be rotated in steps of 90 degrees, so that you can see the board from the other player's point of view, or from either side. It would have been nice to have had more accurate control over board movement – perhaps a tilt facility as well as rotation.

Another smaller, two-dimensional, board is also displayed, and this mirrors the state of the main board. This can be used either for quick reference or to move pieces.

Twenty skill levels are available giving almost instant moves at one extreme, and moves that take anything up to half an hour or more in the other. Play can be between two people, computer versus player or computer versus computer.

A book of standard chess openings is included and can be toggled on or off. It can be added to by extracting moves from a 'human v human' game during play. There is no way the program will 'learn' by its mistakes – such a program would be more complex, but very difficult to beat.


BORED? TRY 3D CHESS

One 'feature' listed on the back of the box is that *Chess 3D* 'takes full advantage of the speed of the Archimedes'. I put this to the test by playing it against David Pilling's *Chess* which seemed to predict most of *Chess 3D*'s next moves, well within one minute! All games between the two programs ended in stalemate though, so in skill, they were equally matched.

Chess 3D could have been an excellent venture into the Archimedes market, but unfortunately it is let down by bad presentation. At £19.95, it is reasonably priced, although its nearest, and better, contender is only £4.95. With a little tidying (and speeding) up, *Chess 3D* could be transformed from an average game to a product worth looking at.

Rob Miller

FINE RACER

Eterna. Tel: (0933) 279 300. Archimedes/A3000 £19.95

In this racing game from Eterna, the viewpoint is not the traditional looking up the car's exhaust pipe. Instead, it is from a helicopter flying over the track following your car.

The track scrolls smoothly in four directions, and it is beautifully detailed, down to people leaning on the fences that I often rammed into – not on purpose, of course!

The main aim of the game is to win races, thereby gaining money and points. Your opponents are computer controlled and they go to all lengths to stop your car, even extending an invisible force field so that you can't get round them when they overtake!

As you go around the track your car gets worn out, so you have to pick up the bonuses which replenish your tyres, engine and fuel. You can also buy these from the spare parts shop (in which you can't buy much else) with your hard earned money. To win a race you also have to run over the eight checkpoints before any of the other cars reach the end of the track.


ADDICTIVE RACING CAPERS

Turbos and bombs are also supplied. Pressing SPACE uses a turbo, sending you flying into the next wall that happens to cross your path. Bombs are dropped behind your car, temporarily stunning anybody snuggling up to your tail.

The car is rotated with the z and x keys (not the mouse unfortunately) and the rotation is rather coarse.

Acceleration is achieved with a single key, which is tapped at to get an average speed – not ideal but, once you've mastered it, the keys are suitable.

Fine Racer has a certain charm. It would have been perfect, save for the awful collision detection.

It has great graphics and adequate sounds, but no option to turn the sound off.

The game is also a little clumsy to use – sometimes I found myself starting a race when I didn't want to.

All these criticisms aside, it's still a great game, terribly addictive, good looking and good fun.

Paul James

Looking for a simple, cheap art package for your Arc? Then *Paintbox* by VisionQuest could be it. It is a mode 15 drawing package with a number of drawing tools.

Double-clicking on the *Paintbox* icon installs it on the menu bar in the usual Risc OS way, however the program takes over the whole screen and no use is made of the Wimp environment.

The majority of the display is taken up with the drawing area, with the Tool menu and palette occupying the left side of the screen. *Paintbox* contains all the basic drawing tools one would expect in a paint program. Lines can be drawn free-hand or by rubber-banding and objects, such as triangles and rectangles, can be either made up of lines or filled with a colour or pattern.

A number of pre-drawn patterns are included on the *Paintbox* disc and can be loaded when required. The pattern size is limited to 16 × 8 pixels, meaning that sprites can not be used to fill shapes.

Free-hand drawing offers two different brush styles, circle or line, which can be enlarged from one pixel to an area roughly 64 × 28 pixels. Brushes can also be grabbed from the screen in a similar sized box, or drawn by hand.

The resulting 'custom-brush' is not even a true brush, as attempting to use it to paint in a different colour results in the original brush colour (or colours) being used. Therefore, there is no way of creating a brush that will draw in any colour or pattern.

Selecting colours can be done in three ways – either from an extremely tiny palette at the top of the Tool menu, from the Palette submenu, or from the main screen area.

The first palette is too small to be of any use, as each colour is displayed in just two pixels. The Palette option in the main menu uses a much larger grid of colours and they are also arranged in meaningful scales and shades to aid selection. Unfortunately, you have to select the Palette tool each time you wish to change colour and this has the effect of deselecting whatever tool you are using.

Selecting colours directly from screen is quick and easy but you need to have the colour present on screen to be able to copy from it.

Once you've doodled a bit, a pixel editor is essential for removing odd pixels and touching up. *Paintbox* provides a basic enlargement 'window' that gives a zoomed version of the area currently under the pointer.

There is no way of changing the magnification to anything larger – it is permanently set to approximately 3:1 and would have benefitted by being bigger by a factor of one or two. No grid is provided, so it is difficult to align pixels vertically or horizontally.

More advanced line drawing facilities are available in the form of curves that can be drawn between two points. In a similar way to the Bezier curves in *Draw*, *Paintbox* curves can be stretched about by means of a control point and then fixed. Unlike *Draw*, each curve has only one control point and cannot be altered once in place.

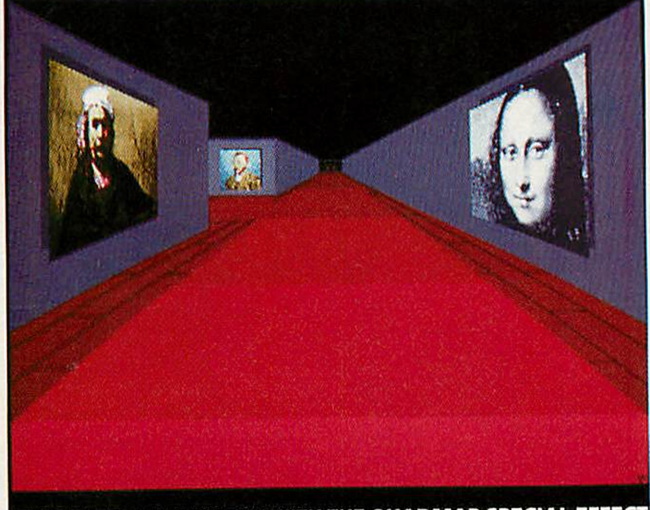
Cut and paste is provided to allow areas to be moved and/or copied around the screen and you can cut around an area using a rubber-banded line. Once cut, shapes can be rotated, shrunk or flipped in either the x or y direction.

The Sprite menu offers almost identical options to that of cut and paste, the only difference being that you can select a mask colour for a sprite for fiddly shapes. A very simple animator allows short films to be constructed from your own sprites by typing their names into an order list.

Paintbox has a number of special effects to its credit. QuadMap takes any rectangular area of the screen and squashes it into any four sided shape. The process of mapping is rather slow but the results can be quite good, as seen in the accompanying picture.

SIMPLE HUES

ROB MILLER dips his brush into VisionQuest's Paintbox and discovers the art of drawing on a budget



RECREATING A GALLERY WITH THE QUADMAP SPECIAL EFFECT

The usual edge-detection, tracing and anti-aliasing tools are all present, although the latter fails to work properly and appears to add extra pixels to any vertical or horizontal lines. A blur tool allows 'smudging' of areas and a clean-up tool is useful for removing extraneous pixels.

Text can be placed anywhere on screen, in any size, in one of three fonts – Plantin (similar to Times), Flash (a sort of Brush stroke font) or Broadway (a 20s-style font).

Paintbox is a simple painting program and might appeal to occasional doodlers. No use is made of the Risc OS desktop and so 'ease of use' takes some time getting used to.

Although a lot of effort has gone into producing *Paintbox*, the end result pales against the competition. If this product had been around when the Arc first appeared, it would have been worth considering.

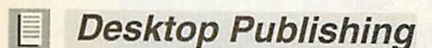
For about £20 more, there are a number of other packages that far outshine it.

PRODUCT DETAILS

Paintbox for the Archimedes costs £32. Contact Vision Quest, 46 Holte Road, Atherstone, Warks CV9 1HN.

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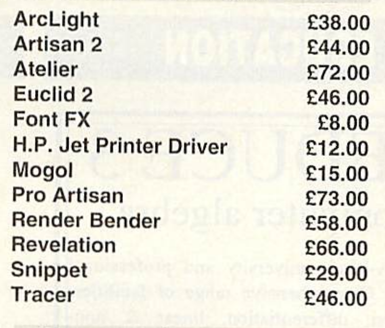
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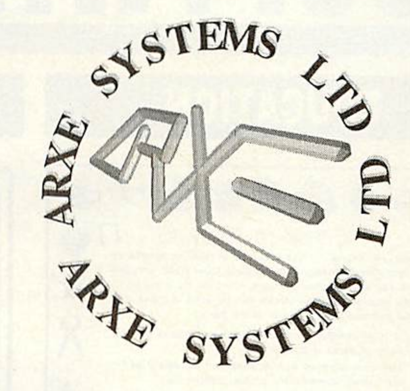


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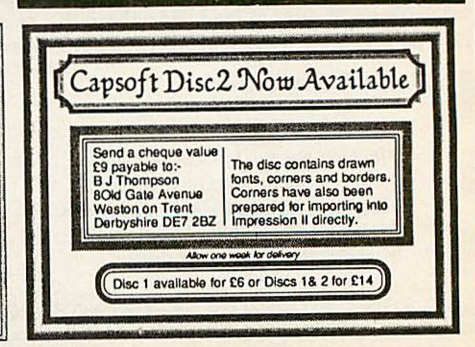
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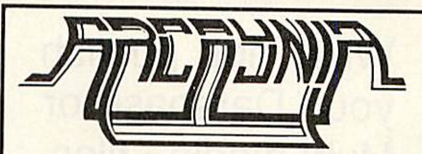
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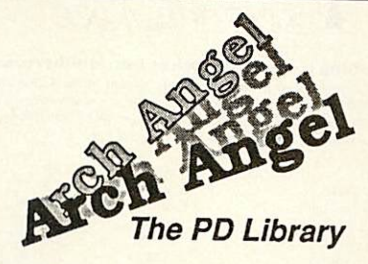
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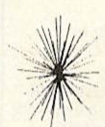
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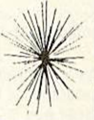
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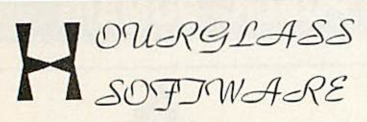
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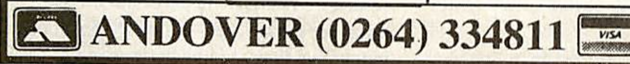
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ACORN USER ADVERTISEMENT PAGES - AUGUST 1991

4-Mation 100
4th Dimension 103,114
Academic Software 124
Ace Computing 48
Alan Blundell 125
Aleph One IFC
Alpine Software 126
Alsystems 11
Appian Way 124
Arc Angel 125
Arcaynia P.D. 125
Arch PD 125
Arxe Systems Ltd 123
Atomwide Ltd 16
AVP Computing 63

Beebug 6,8
Broomfield Electronics 52

Chameleon Computers 54
Circular Triangles 124
CJ Computers 126
CJE Micros 60
Clares Micro Supplies 80
Codemist Ltd 124
College Computers 4-5
Colton Software 2
Computer Concepts 74-77, 118
Computer Depot 102
Computer Focus 106
Contex Computing 48
Cream PD 125
CSS 82

Dabhand Computing 94-95
Datafile 125
Datastream 126
Datazone PD 125
David Pilling 106
Dixon & Dixon 126
DVS Skyfall P.D. 125

E.S.P. 124

Fact Systems Ltd 127
Fairhurst Computer 102

Ground Control 102

HCCS Associates 110
Hour Glass Software 126
Human Computer Interface 58

Ian Copestake Software 1,12
Idea 124
IFEL 62
Indata 126
Integrex 97
Intelligent Interfaces 53

Kendal Computer Centre 126
Kudlian Software 124

Le Computer 126
Longman Logotron 68
Loughborough University 124

Manor Court Supplies 82
Micro Quest 106
Micro-Aid 33
Midnight Graphics IBC
Minerva Software 11
Morley Electronics 66

Northern Micromedia 124
Norwich Computer Services 102
Nova Visual Services 124

Oak Solutions 14,19,20,22-23
Orion Computers 28-29,96
Ozone Friendly PD 125

Portobello Trading Company 48
PRES 26
Pyramid Computer Services 54

RJM 52

Selective Computer Services 124
Senlac Computing 127
Serious Statistical Software 126
Simtron 82
Soft Sector 106
Software Bargains 107
Superior Software OBC

T.M.J. Computer Software 127
Technomatic 30-32
Ted Kirk 126
Terrel Electronics 106
The Data Store 33
The Serial Port 55,112
Timestep Weather Systems 82

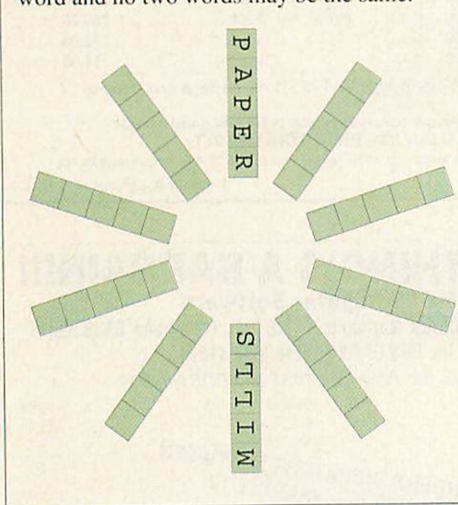
Unilab 62
Universal Computer Support 126

Vision Quest 126

Watford Electronics 34-37
We Serve 33

Word Star

Can you get from 'PAPER' to 'MILLS' and back again changing only one letter at a time? Each stage must be a valid English word and no two words may be the same.



Cloak and Stagger

We are indeed fortunate in being able to bring you a preview of a staggering new full-force flight simulator from Bolivian software company Tiempo Perdido (Time Warp Software).

much of the hard work of flying is performed by the on-board LACSOC* many of the controls are manipulated via the keyboard. J and N adjust the pitch of the superjet, F and G the angle of yaw. Power to the main thrusters can be increased and decreased with L and K respectively.

As you glide smoothly and effortlessly over 100 million square miles of contoured landscapes be wary at all times for the deadly array of enemy hardware, all protected by the latest in cloaking devices. Lucky for you that your plane too is cloaked, although while active the device will also obscure your contols and sensors.

* LACSOC = Laser Access Control System Opposite the Coffee-machine

£25 CROSSWORD PRIZE

```
10MO.4:
  GC.3,7:
  OSC."FX11,4":
  OSC."FX12,10":
  SO.0,-15,3,255:
  p=50:
  x=640:
  y=512:
  a=0:
  REP.SO.1,0,p,1:
  w=850*COSa:
  h=850*SINa:
  MOVEx-w,y-h:
  DR.x+w,y+h:
  A%=19:
  CA.-12:
  DR.x-w,y-h:
  k=ASCINK.0-70:
  a=a+((k=0)-(k=1))/20:
  y=y+((k=8)-(k=4))*p/9:
  p=p+((k=5)-(k=6)):
  U.0
```

Note that this single line has been split at colons to aid legibility

Computer Buffs

Peter, Dave, Brian, John and Graham each used different computers, printers and wordprocessors. The computers included the Electron, model B, Master 128, Master Compact and Archimedes. Epson, Star, Panasonic, Citizen and Canon printers were used. Using just the seven clues listed below, can you deduce who owned which computer and printer and which wordprocessor did they use?

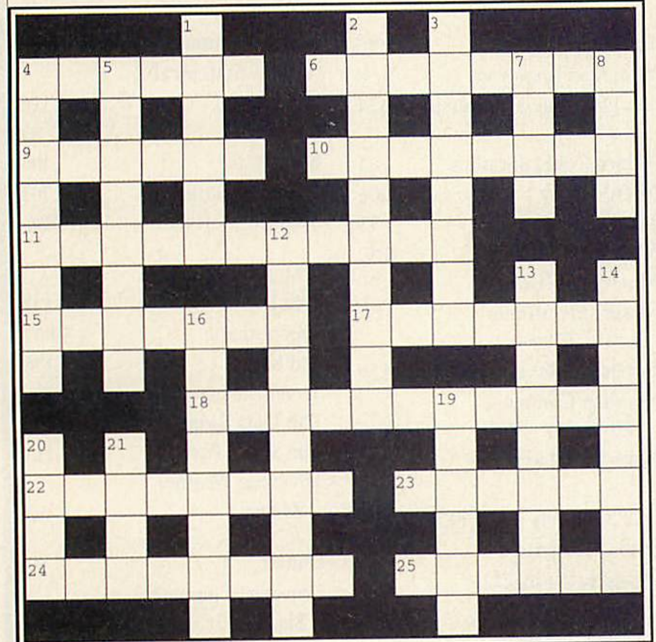
1. John bought an Electron with an attachment to take a *View* cartridge
2. *Pipedream* was used on the Archimedes
3. The model B had a Citizen attached
4. Graham had a Compact and Panasonic but didn't use *Wordwise*, which was used by Dave
5. Peter could not afford an Archimedes, nor did he use *Interword*
6. The Star was used with *Mini Office 2*
7. Brian bought an Epson

Many thanks to G Thompson of Leicester for the logic puzzle on the left. He receives £25 for his truffles.

If you have a puzzle to tax the eager minds of the BAU readership then do send it in. We have no particular preferences for puzzle types although the more innovative they are, the better chance they stand of earning a BAU reward.

Answers to this month's selection of posers will be given in September's issue. The prize crossword solution will appear in two months' time.

BBC Acorn User cryptic crossword, August 1991
set by Trebonianus



Chambers 20th century dictionary is recommended. Send your entries to *BBC Acorn User*, 20-26 Brunswick Place, London N1 6DJ to reach us by Wednesday July 31 1991. Photocopies of your solution are acceptable. The winner of June's crossword (answer shown right) is Ken Cowap of Hertfordshire.

Across

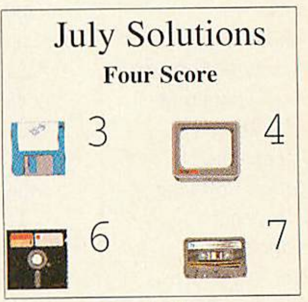
4 In this area, pedlars harvested (6)
6 Mimic lost amulet (gold) (8)
9 Longs for tales about the End of Time (6)
10 Republican emblem of fake stone (8)
11 Did BBC producer cause Nigel sorrow? (5,6)
15 Small computer (7)
17 Embroidery tester (7)
18 Any more acid could help us fly (11)
22 4 Across and 4 Down for example (8)
23 A pig for a pound and five (6)
24 Across in Europe, duet improvised and finished (8)
25 Mechanical men repaired king's boot! (6)

Down

1 Note old apple turnover (6)
2 Aphid seems confused and stressed (10)
3 Section of plant must be returned before miners can produce metal in US (8)
4 Render picture using array etc (3,5)
5 Mixtures of colourless lagers, madam? (8)
7 Agent returns swag (4)
8 Dissolute example of 7 (4)
12 They have connections with dodgy club's trainee (10)
13 Mallet in Wonderland (8)
14 Julia sets an example of these (8)
16 Girl sitting on branch heard ticking clock (8)
19 Entrepreneur only has one brain cell! (6)
20 Connector's side? (4)
21 Paperboy at wedding (4)

July Solutions

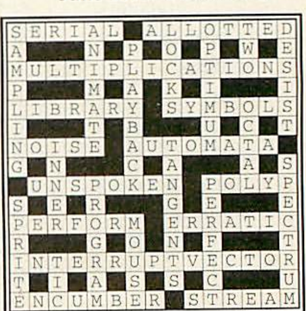
Four Score



Word Chain

PAINT
PAINS
PAILS
TAILS
TOILS
TOOLS

June Prize Crossword





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For use with the Archimedes, TRACER is an ARM coded RISC OS multi-tasking application and will easily run on a 1Mb machine.

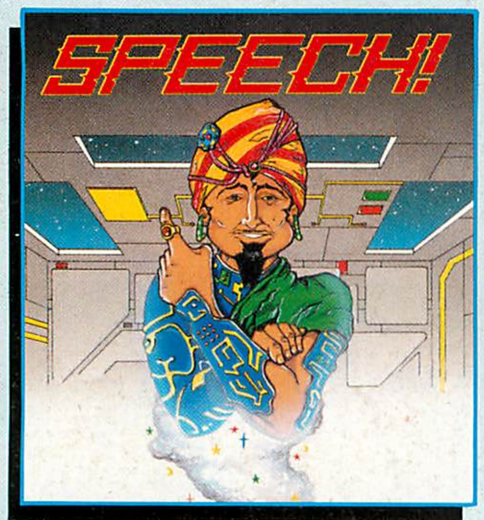
TRACER. The Creative Computer Drawing program. RRP £52.13 (excl. VAT).

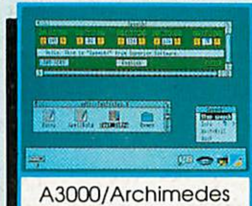


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The new A3000/Archimedes version of SPEECH! is fully RISC OS compatible and allows multitasking in Desktop. You can vary the pitch, speed, volume, and voice, both directly and in your own text files and programs, and can even 'sing' words over a four octave range! The A3000/Archimedes version also includes a program so you can alter the dictionary yourself.

BBC Micro/Master & A3000/Archimedes

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In the 1 player game, try to get the highest break - you might even manage the maximum break of 147. In the 2 to 4 player game, compete against your friends and family for the highest score and highest break.

Start your frame with an easy red question, then choose your colour - have you the nerve to choose the black ball question? You've used all your PASSES and the ball is OVER THE POCKET - if you miss, it's a FOUL SHOT!

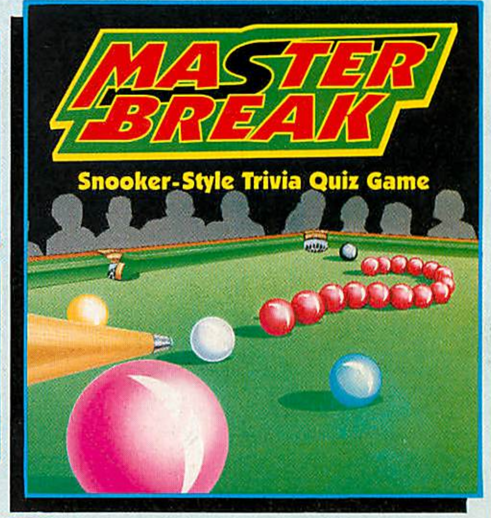
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BBC Micro/Master, Electron & A3000/Archimedes



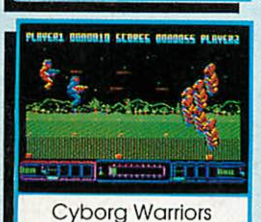
BBC Micro/Master


A3000/Archimedes






Last Ninja 2


Cyborg Warriors

PLAY IT AGAIN SAM 15

A New Action-Packed Four-Game Compilation

LAST NINJA 2

The Last Ninja is back with a vengeance! Battling with fists, shuriken stars, swords and lots of other devious weapons, against the evil Shogun in downtown New York.

"Animation is excellent and there's lots of detailed scenery. The puzzles are quite fiendish"....Micro User.

CYBORG WARRIORS

A brand-new release by Superior. A multi-level, sideways scrolling shoot-em-up, with lots of weird robots and monsters to shoot, and tokens to collect which can give more powerful weapon systems. The BBC Micro/Master version has a joystick option, which allows two players to battle together.

NETWORK

An action-packed 'Top Ten' game by Peter Scott, featuring teleport machines, lifts, springs, strange aliens and lots, lots more. Shoot your way through more than 100 different screens as you attempt to collect the twenty parts of the 'Flynche' machine. Nerve-tingling excitement.

RICOCHET

A massive arcade adventure with brilliant graphics, as you control SPRAT, the Small Partially Robotic Alien Time-traveller. Five different levels: FORTRESS, TECHLEV, DERELICT, THE UFO and ANCIENT.

"A superb problem-solving game. A must for your games collection"....BBC Acorn User.

BBC Micro/Master & Electron

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